T-6B

Flight Instructor Guide

MARCH 2016

Commander, Training Air Wing FIVE (CTW-5)

NAS Whiting Field, Milton, FL **COMTRAWINGFIVEINST 3710.16A**

DEPARTMENT OF THE NAVY
COMMANDER
TRAINING AIR WING FIVE
7480 USS ENTERPRISE STREET SUITE 205
MILTON, FLORIDA 32570-6017

IN REPLY REFER TO:
COMTRAWINGFIVEINST 3710.16A
N7
15 Mar 16

COMTRAWING FIVE INSTRUCTION 3710.16A

Subj: PRIMARY FIXED WING FLIGHT INSTRUCTOR GUIDE (FIG)

1. Purpose. To publish a comprehensive "Best Practices" guide detailing techniques and recommended procedures for Fixed-Wing flight instructors within Training Air Wing FIVE (TRAWING FIVE).

2. Cancellation. COMTRAWINGFIVEINST 3710.16

3. Scope. This instruction promulgates standardized instructional practices applicable to the safe, effective, and orderly conduct of instructional flight operations in a single compendium. In no case shall the Flight Instructor Guide (FIG) supersede directives of higher authority, nor is it a substitute for the sound judgment of Instructor Pilots.

4. Action. All Fixed-Wing flight instructors shall be familiar with this instruction. Items annotated by "shall" are compulsory in nature.

5. Review. Annual review of this instruction is mandatory. Recommended changes are encouraged and should be forwarded in writing to the TRAWING FIVE Standardization Officer via the Squadron Standardization Department.

6. TRAWING FIVE POC for this instruction is the T-6B Standardization Officer, COMM 850-623-7522 or DSN 868-7522.

G. A. KLING

Distribution:
COMTRAWINGFIVEINST 5216.1U
List II (a-c, f, i, m-p)

TABLE OF CONTENTS

SUMMARY OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	CHANGE DESCRIPTION	PAGES AFFECTED/ INITIAL

THIS PAGE INTENTIONALLY LEFT BLANK

CHAPTER ONE
COMMANDER'S INTENT

100. MISSION. Our primary mission is to develop effective leaders and aviators. We are setting the conditions for future combat success. Build the best foundation possible. We will train and provide the world's finest pilots for the United States and her Allies for the successful defense of their citizens and way of life.

101. VISION. We will accomplish our mission through superior preparation, ensuring those officers being trained for the tactical employment of aircraft in our National Defense are better and more prepared than we were. We will extend ourselves as teachers to guarantee they receive the world's finest training, and as mentors to ensure we develop the necessary leadership qualities in our student pilots. Our goal is to successfully produce quality aviators on time to their respective nations and services so they can act in their nation's defense.

102. SAFETY. Safety is a product of professionalism and integrity; quality training is what counts. It is expected that each and every Instructor Pilot (IP) use Operational Risk Management (ORM), and Crew Resource Management (CRM) and apply common sense to all that we do. Do what is right; take care of yourselves and each other.

103. THE INSTRUCTOR PILOT.

Instructor is a higher designation than Aircraft Commander, with a tremendous increase in responsibility.

1. The IP knows "Wings of Gold" are more about judgment and maturity than they are about flying.

2. The IP is a leader, mentor, and one who continually seeks professional self-improvement to produce a better officer and aviator.

3. The IP is a true professional with the highest integrity.

4. The IP leads by example: "If I do it, it's okay to do."

5. The IP fully understands the Commander's Intent; he leads, teaches, and flies with this intent in mind.

CHAPTER TWO
PHILOSOPHY OF TRAINING

200. **INSTRUCTOR PILOT (IP) RESPONSIBILITIES.** The IP should arrive at each syllabus event ready to give the student the best possible instruction. Specifically:

1. Be completely familiar with applicable CNATRAINST 1542 series and refer to them often. New IPs will need to review the Course Training Standards (CTS) often to ensure accurate grading when completing Aviation Training Form (ATF). IPs must also be familiar with CNATRAINST 1500.4 series (TA Manual) and understand it is the source document for all policy, guidance, and procedures in support of training Student Naval Aviators (SNAs). If Joint Primary Pilot Training (JPPT), or another syllabus does not cover a specific matter, it is most likely addressed in the 1500.4 series.

2. Be persistent when trying to complete your event(s). Avoid cancelling events too early due to aircraft or weather issues. The IP is expected to make every effort to execute all assigned sorties.

3. Arrive at the brief ready to explore discussion items in detail. It should be a point of pride that the IP's knowledge on any given topic is completely accurate during the brief.

4. Establish and maintain the instructional "Flight Box." The IP and SNA should progress from the brief to the flight as a team. The IP is expected to accompany students to Aircraft Issue, and participate in a full pre-flight, as required.

5. Provide quality instruction in the air throughout the event. An IP must be attuned to both a student's strengths and weaknesses, and adapt teaching techniques to achieve the best results. The most effective IPs are demanding, engaged, and innovative in their instructional technique.

6. When confronted with unsatisfactory performance, the IP should have no qualms grading the event as unsatisfactory. Grade according to the standards set forth in CNATRAINST 1542 series.

7. Maintain the aircraft within safe parameters throughout the syllabus event. The safety of the aircraft and crew are the IP's paramount responsibility. It is the nature of flight training that IPs routinely identify and counteract airwork and headwork errors that, left unchecked, could end in disaster. A watchful IP never truly gives up control of the aircraft, and a SNA's failure to recognize an error does not absolve an IP's obligation to remain in complete control of the training event at all times.

201. **STUDENT NAVAL AVIATOR (SNA) RESPONSIBILITIES**. SNAs are responsible for their own training. They are expected to carry themselves as professional military officers. Their uniform and grooming standards shall be per their service requirements. They shall strive to arrive to all events prepared to thoroughly discuss all briefing items. They should be physically and mentally prepared for training. SNAs should be able to discuss any problem areas and strong points they have in training. UNSAT areas or those maneuvers that are not up to Maneuver Item File (MIF) must be discussed.

202. **INSTRUCTION VS. EVALUATION**

DEFINITIONS

Instruct - To teach, train. Give order or command.

Evaluate - To determine or fix the value of; determine the significance or worth.

1. Both of the above are required to transform a prospective SNA into a winged aviator. IPs should instruct on all flights, to broaden the SNA's knowledge. It is on Check Rides that evaluation must also take place. During these flights, SNAs should be able to demonstrate their knowledge and flying ability to the IP. However, if an SNA is struggling during the evaluation flight, an IP should return to instruction and allow another opportunity for the SNA to succeed and demonstrate their ability.

2. Each SNA is different. In order to train prospective Naval Aviators, the IP needs to be an effective, efficient, and diverse communicator. SNAs will respond differently to varying methods of instruction; therefore, the IP should develop a 'tool box' of various teaching techniques that will allow them to adapt to effectively teach any type of SNA. IPs should seek out seasoned instructors to expand their knowledge and aid in other effective methods of instruction.

3. Flight school is meant to be tough and stressful; however, if an SNA becomes overloaded or overwhelmed, instruction will be ineffective. The IP must learn where that critical point is; some SNAs will reach it much earlier than others. While IPs should want every SNA to succeed, they must award an UNSAT when the SNA has failed to meet the minimum standards for that particular flight event.

4. "Lead by example." IPs must provide leadership to prepare SNAs for the next level - *the Fleet*. IPs are not only teaching SNAs how to fly, but must also continue to mentor them as an Officer. This should occur during the brief, flight, de-brief, and while on and off-duty. Students have earned the privilege to be treated as officers and should be held accountable.

203. PROCEDURE VS. TECHNIQUE

DEFINITIONS

Procedure - A specific way of accomplishing a maneuver; a series of steps followed in a regular definite order; a traditional or established way of doing things.

Technique - A method of accomplishing a desired aim.

1. While it is appropriate to teach both procedure and technique, IPs need to work within certain bounds. Remember, flight training is where the SNAs receive the basic foundation of both knowledge and procedures that will guide them in the Fleet. Instructors must train per established and appropriate publications and standards. No instructor has ever served his SNA by challenging a requirement or exploiting a loophole in the rules.

2. So, what is this base of knowledge? It's simple: all the appropriate publications, such as the FTIs, FWOP, squadron SOP, NATOPS, JPPT, OPNAV, and FAR/AIM. The most referenced pub is the applicable FTI. IPs must teach and instruct per the FTI. How does the IP accomplish this? This is where instructor technique comes in. We all may have different methods to accomplish a maneuver. Teaching this method is fine so long as it fits into the procedure within the FTI. There will be many different instructor techniques. In developing their own technique, an IP should seek out perspectives from other instructors.

"Demonstrate and talk about technique, but teach and grade by the FTI."

A common feedback from SNAs is that they believe they are graded on their ability to mimic a specific instructor's personal technique on a maneuver. The IP is obligated to emphasize when he is demonstrating personal technique, so the SNA does not confuse it with FTI procedure.

CHAPTER THREE
JOINT PRIMARY PILOT TRAINING (JPPT) CURRICULUM

300. Overview of JPPT. The following is a brief discussion of JPPT and is not meant as a replacement for reading and understanding CNATRAINST 1542 series. The purpose of this chapter is not to outline JPPT, but to amplify and support certain sections in an effort to prevent common misinterpretations. IPs are responsible for studying and becoming completely familiar with CNATRAINST 1542 series. One of the reasons JPPT was implemented was to provide more objectivity and consistency in SNA evaluation. JPPT is very flexible and will allow IPs to tailor a flight.

301. Grading and Grade Sheets.

1. Course Training Standards (CTS). Chapter IX of JPPT defines CTS and contains the Graded Item matrix.

a. "Standard equates to **Good** (G/4)." If the maneuver flown solely by the SNA is within CTS then that maneuver should be graded as a G/4. However, JPPT later states that "Performance may be within CTS and still not warrant a grade of ***Good*** if control inputs are delayed, erratic, imprecise, or inappropriate." The two aforementioned statements may seem contradictory, but they are not. **Example:** A student continually and erratically fluctuates between +/- 75 feet from assigned altitude. The SNA is within CTS parameters for Basic Airwork (BAW) (+/- 100 ft), but if inputs are delayed or imprecise, the IP may grade BAW less than a G/4.

b. Maneuver Item File (MIF) and CTS are not the same. In addition, MIF is not "Average" nor should it be labeled as such. MIF is the minimum performance a SNA must meet for a particular maneuver before the End of the Block (EOB). If MIF is a U/2 for the block and the SNA earns a U/2, the SNA is NOT "within CTS" but rather has "met MIF". If MIF is a F/3 for the block and the SNA earned a U/2 for that flight, the student has not met MIF for the block and will need to earn a F/3 before the EOB.

c. Although JPPT strives to be objective in its approach, it is not perfect. Some IPs grade differently than others but are still grading according to JPPT. **Example:** A student performs three Power on Stalls at F/3 level but then performs a fourth at G/4 level. Some IPs could argue that the stipulation of a G/4, "Characteristic performance is within CTS" prevents the IP from grading the maneuver as a G/4 since the student characteristically performed at a F/3. Others may argue that the student was able to meet MIF and CTS by the end of flight. There is no right or wrong answer, but the IP's justification needs to be apparent on the student's grade sheet.

d. Coaching a student through a maneuver is a very acceptable practice to provide guidance for a SNA to execute a new maneuver correctly. However, coaching on every maneuver does not allow the SNA the ability to properly earn a G/4. IPs should coach their SNA when necessary but also provide the SNA the ability to execute maneuvers without any input from the IP so they may both learn from their mistakes and potentially earn a G/4.

2. Aviation Training Forms (ATF / Grade Sheets). The IP should use the following guidance when writing the ATF.

a. An IP should remember the SNA is not the only one who will read an ATF. ATFs will be scrutinized all the way up the IP's chain of command, and will be referenced in Training Review Boards, FNAEB Proceedings, Human Factors Boards, JAGMAN and Mishap Investigations, and Congressional Inquiries. The conscientious IP will take time to correctly complete the ATF and ensure comments are both professional and do not contradict the actual grade awarded.

b. Below are some ATF comments the IP must ensure to document.

(1) General Comments - This item must be completed on all ATFs. The IP shall ensure appropriate comments are written here. Some examples are: where the flight was conducted, profile, approaches flown, weather, overall performance or progression, trends, SNA motivation, or attitude. General Comments shall begin with two words to indicate overall grade / status of event. **Example:** "Pass/Incomplete," "UNSAT/Complete."

(2) Incomplete flight - If a flight is incomplete an IP must provide a written rationale on the ATF. **Example:** "Flight incomplete due to weather/maintenance/SNA actively airsick." These comments shall be stated immediately following the grade / status.

(3) Safe-for-Solo Comments - On completion of a curriculum dual flight preceding an SNA solo, the instructor shall check either "Safe for Solo" or "Unsafe for Solo" on the ATF. A good technique is to also include "Safe for Solo" in the general comments.

(4) Special Syllabus Requirements (SSR) - Unless noted otherwise, instructors may complete an SSR on any flight within the block. Annotate which SSRs were completed in the ATF's comments section. Also assign NG/1 as the SSR maneuver grade and annotate date of exposure on the SSR tab.

(5) Graded Items - Any maneuver that is graded E/5 shall have a comment that defines why that grade was awarded. A grade of a U/2 requires a comment only if MIF is not also a U/2. When commenting on a grade that is below MIF, document the cause and effect and suggest ways to correct any problems. Do not use the adjectives, Fair, Good, or

Excellent unless they coincide with the grade given (Fair = 3, Good = 4, Excellent = 5; never use "good" to describe anything other than a G/4). Avoid using terms such as "Above"/"Below" "Average." Instead, use the prescribed terms of the grade awarded (UNSAT, Fair, Good, or Excellent).

(6) (NG/1) "Not Graded" - An IP shall mark "not graded" (NG/1) whenever the IP has demonstrated a maneuver or completed an SSR. An IP should not mark this block simply because a maneuver was not completed during a flight (i.e., Did Not Do).

(7) UNSAT flights - If an IP grades a flight as UNSAT, the IP must thoroughly document the reason(s) in the appropriate maneuver section(s) and/or general comment section of the ATF. An IP is obligated to provide as much detail as possible.

(a) Marginal flights are printed on blue paper.

(b) UNSAT flights that do not otherwise keep an SNA from progressing (trigger an IPC/FPC) are printed on yellow paper.

(c) UNSAT flights that generate an IPC/FPC (including UNSAT IPCs or FPCs), are printed on pink paper.

(8) Flight time required comments - If an IP exceeds +/- 0.3 hrs of the allotted hours per event (HR/X) for that event, the IP must document an appropriate reason in the General Comments section. Acceptable reasons include deviations for weather, maintenance, ATC delays, or IP proficiency. Spending extra time with a struggling SNA in order to achieve a minimally sufficient skill level is not appropriate; it is for that reason the system has a grade of UNSAT.

(9) Ensure approaches logged (TYPE/#) match the approaches graded as maneuvers (i.e., If an ASR and PAR were graded, make sure you have B/1 and A/1 logged at the bottom).

(10) IPs are required to sign all pages of the ATF.

302. UNSAT and Marginal Performance. JPPT defines what "Unsatisfactory" and "Marginal" are; however, the CNATRAINST 1500.4 Series (TA Manual) has a more robust discussion on both. Common misconceptions regarding when and how to award an UNSAT or Marginal are briefly outlined below.

1. UNSAT. An overall UNSAT is at the IP's discretion, unless it is automatically triggered by JPPT or regression rules.

a. Flights/Simulators:

(1) Flight UNSATs may be awarded anytime following the successful completion of an event brief. **Example:** If the SNA has a good brief but his ADB knowledge or preflight are below MIF, at the conclusion of the flight he should be awarded a Flight UNSAT. The grade sheet in this case will be UNSAT/Complete.

(2) A student can be awarded an UNSAT without a maneuver being graded a U/2, however, the IP should weigh the benefits of giving an UNSAT versus a Marginal in this situation.

(3) If a student has not flown in 7 calendar days, the IP can use an UNSAT to drive an Optional Warm-up (WU). Instructors retain the ability to award a "count" UNSAT on a WU or Extra Training (ET) event for flagrant safety or flight rule violations, unsatisfactory performance in an area not affected by a delay in training (such as general knowledge, emergency procedures, or course rules) or grossly unsafe performance that is not delay-related.

b. Ready Room UNSAT (RRU): The grade sheet in this case will be UNSAT/Incomplete. A RRU may not be awarded after the completion of a satisfactory brief and is not awarded for a missed brief.

c. Regression: Regression is performance below previous block MIF. Students can regress from one block to another without automatically incurring an UNSAT event.

2. Marginal.

a. The SNA's ability to meet block standards by EOB is in question. **Example:** The SNA performs multiple maneuvers consistently below MIF throughout the flight but has three more events in block to reach MIF.

b. A Marginal can be used to drive an Optional Warm-up if the student has not flown in seven or more calendar days.

CHAPTER FOUR

TECHNIQUES OF FLIGHT INSTRUCTION

400. Overview. The expert ability to fly the T-6B is insufficient to accomplish the task of the Instructor Pilot. It will not only take skill in the aircraft, but also skill as both a flight and ground instructor. Flying and teaching are two very different disciplines. The following is a brief review of the teaching process and flight instruction techniques that will assist in the transition from pilot to Instructor Pilot. A full discussion of the following topics and additional information can be found in the FAA Aviation Instructor's Handbook.

401. The Four Basic Levels of Learning. The four basic levels of learning are Rote, Understanding, Application, and Correlation. The lowest level is the ability to memorize and repeat something which one has been taught and is referred to as Rote learning. The Understanding level is achieved when an SNA can describe or explain a concept in their own words. Once the Application level of learning is achieved, a student should be able to put to use the lessons learned and understood. Finally, at the Correlation level of learning, the student can associate separate blocks of learning and apply this knowledge to future tasks. The Correlation level of learning should be the objective of aviation training. Stated another way, memorization will not ensure our students are combat effective in the future. They must attain the Correlation level of learning in order to retain and apply lessons learned in flight school throughout their military service.

402. Obstacles to Learning. If a student is not ready to learn, the student will not learn regardless of the skill of the instructor. The following is not an all-inclusive list, and the instructor should be perceptive to any obstacles to learning. Additionally, the instructor should attempt to remove (or seek assistance from the chain of command to remove) these obstacles.

1. Anxiety - SNAs are often extremely anxious about military flight training for a multitude of reasons. The pressure to succeed may elevate stress. Rank gradient (ENS flying with CDR) is another reason for anxiety in the SNA. Regardless of the causal factor, anxiety will limit the student's perceptive ability and learning capacity. Although military aviators must learn to manage stress, the instructor must be aware of this obstacle to learning and be prepared to provide resources for a struggling student.

2. Unfair Treatment - Students who believe their instruction is inadequate, adversarial, or that their efforts are not conscientiously considered and evaluated **(graded accurately)**, do not learn well. Motivation also declines when a student believes the instructor is making unreasonable demands for performance and progress. On the

other hand, assignment of goals the student considers difficult, but possible, usually provides a challenge and promotes learning.

3. Physical Discomfort, Illness, Fatigue, and Dehydration - These factors will materially slow the rate of learning during both classroom instruction and flight training. Further, Fatigue and Dehydration are safety concerns and should be immediately addressed.

4. External Concerns - Today's flight student is an adult who may be married with children (who may be sick), experiencing a divorce, death of a parent, or any other significant life event. This may not be readily available information as most military members will make every effort to accomplish the mission, in this case flight training. Instructors must be keenly aware of this obstacle to learning and when discovered, make every effort to provide any needed assistance. Flight Leaders and Class Advisors are a valuable resource as well as the chain of command to include the Commanding Officer.

403. Essential Teaching Skills. Research reveals an effective instructor possesses four essential teaching skills: people skills, subject matter expertise, time management, and assessment skills.

1. People. People skills encompass the ability to interact, talk, understand, empathize, and connect with people. Effective instructors relate well with their students. People skills also include the ability to pick up when students are not following along, motivate students to learn, and adapt to the needs of the student when necessary. Effective instructors also display enthusiasm for their subject matter and are willing to look for ways to match student learning styles to personal instruction style when necessary.

2. Subject Matter Expert (SME). Instructors must possess a high level of knowledge about the aircraft, the regulations, and aviation in general. In addition, effective instructors must also be knowledgeable about teaching. Just like the ability to fly the plane does not equate to the ability to teach the plane, possessing a high level of technical knowledge is essential, but does not guarantee teaching success. An effective instructor must possess a strong motivation to teach, as well as a positive attitude toward learning. Additionally, an effective instructor is always seeking to continue their own professional growth. As a pilot, and especially as an Instructor Pilot, there is always more to learn.

3. Time Management. An effective instructor must ensure the time allocated for the training is well used. They must understand what can realistically be achieved within the allotted time and focus on the teaching points for that particular syllabus event. You can't teach it all on C4101. Further, the JPPT is designed that all items in the block must be up to MIF prior to the end of the block. Nothing requires all maneuvers to be completed each event. An instructor's

focus should be on student mastery of the required maneuver as opposed to rapid execution.

The instructor must also manage the brief and debrief. It is not uncommon for a student to talk at length in an effort to impress the instructor with their knowledge. The conversation should be controlled to ensure the instructor is able to discuss all pertinent topics and evaluate the student's knowledge and preparation.

Also remember, the aircraft is a finite asset. On-time landings are critical in turning the aircraft for a follow-on training event. A good rule of thumb is to walk to the plane one hour prior to scheduled takeoff time. This can obviously be adjusted for the early or later stage SNA.

4. Assessment. Assessment is an essential and continuous component of the teaching and learning processes. A good assessment provides practical and specific feedback to students, including guidance on how to raise their level of performance. Most importantly, an effective assessment contributes to the development of decision-making and judgment, arguably the two most important skills required of the Naval Aviator. A good assessment is organized, objective, comprehensive, and constructive.

404. Suitable Language. Effective communication is concise and precise, especially in the aircraft. Simple words are often better than more complex words, but the instructor should never use substandard English. Errors in grammar and vulgarisms detract from an instructor's dignity and insult the intelligence of the student. Analogies may aid the student in understanding, but also realize slang and colloquialisms may cause confusion for the SNA with a dissimilar background, such as an international student. Technical terms should be accurate and defined so there is no doubt as to their meaning.

405. Characteristics of Effective Questions. Effective questioning is essential during flight training. It allows the instructor to gauge the SNA's preparation and level of knowledge. It can even be a useful tool in teaching good decision-making skills and evaluating an SNA's judgment. However, effective questioning is not an easy task to do well. Below are five characteristics of a good question:

1. Applies to the subject of instruction.

2. Brief and concise, but also clear and definite.

3. Adapted to the ability, experience, and stage of training of the student.

4. Center on only one idea (limited to who, what, when, where, how, or why, not a combination).

5. Present a challenge to the student.

406. Types of Questions to Avoid. Effective questions to evaluate understanding never include yes/no questions such as "Do you understand?" or "Do you have any questions?" The SNA will ALWAYS understand and NEVER have questions. Instructors should also avoid the following types of questions:

1. Puzzler - "What runway would you choose during a Forced Landing at NSE if the winds at altitude indicate 360/10, Tower reports winds 140/12, the runway has 1.5 inches of standing water, the first 1,000 feet of RWY-14 are closed for repairs, and the flaps are stuck up?"

2. Oversize - "What do you need to do to prepare for a cross country?"

3. Toss-up - "If I go lost comm, should I squawk 7600 or maintain VMC conditions?"

4. Bewilderment - "As you know, the aircraft can transit 5000 feet of light rime icing. With that in mind, considering altimeter setting, what precaution should you take when flying from a cold air mass through a warm front in mountainous terrain?"

5. Trick Questions - This type of question will cause the student to develop the feeling they are engaged in a battle of wits with the instructor, and the intended instruction will be lost.

6. Irrelevant Questions - This type of question is a diversion that introduces unrelated facts and thoughts and will slow the student's progress.

407. Demonstration - Performance Technique. This teaching technique is best suited for mental or physical skills that require practice and is based on the principle that people learn by doing. First, identify the most important learning objectives. Next, explain and demonstrate the steps involved in performing the skill to be taught. Then, allow the student time to practice each step, so they can increase their ability to perform the skill. There are five steps in the Demonstration performance method: Explanation, Demonstration, Student Performance, Instructor Supervision and Evaluation.

1. Explanation - Must be clear, pertinent to the objectives of the lesson, and based on the known experience of the student. The instructor must convey precise actions the students are to perform and the end result of these efforts. Any appropriate safety procedures should be included and students should be encouraged to ask questions to ensure understanding.

2. Demonstration - Demonstrate the actions necessary to perform the skill with as little extraneous activity as possible. If the demonstration does not go as planned, the deviation should be immediately acknowledged and explained.

3. Student Performance and Instructor Supervision - These two steps happen concurrently and are therefore discussed together. Students should be given the opportunity to perform the skill as soon as possible after a demonstration. The instructor may allow the student to follow along on the controls during the demonstration. Immediately thereafter, the instructor should have the student attempt the maneuver, coaching as necessary.

4. Evaluation - In this step the instructor judges the student's performance. Immediate feedback may be given briefly in the aircraft and another attempt at the maneuver may be warranted. Additionally, a thorough debrief should be provided following the flight with recommendations to correct any deficiencies.

408. The Telling and Doing Technique. This technique has the benefit of continual verbal interaction between the student and instructor and allows the instructor to determine whether an error is caused by a misconception or a simple lack of motor skills.

1. Preparation - The instructor must carefully plan the step-by-step demonstration with an accompanying detailed, verbal explanation.

2. Instructor Tells, Instructor Does - While demonstrating inflight maneuvers, the instructor should explain the required power settings, aircraft attitudes, and describe any other pertinent factors that may apply. Communication is the key. Use clear, concise communication and avoid unnecessary jargon and technical terms the student may not know. The student may follow along on the controls.

3. Student Tells, Instructor Does - The student plays the role of the instructor and tells the instructor how to fly the maneuver. This allows the instructor to evaluate the student's understanding of the steps necessary to perform the maneuver while the student, freed from the need to concentrate on performance, can organize their thoughts on the steps involved and the techniques to be used.

4. Student Tells, Student Does - This is the application step and where learning takes place and habits are formed. Therefore, the instructor should be alert during the student's practice to detect any errors in technique so as to prevent the formation of faulty habits.

5. Evaluation - In this step the instructor judges the student's performance. Immediate feedback may be given briefly in the aircraft and more practice may be warranted. Additionally, a thorough debrief should be provided following the flight with concrete recommendations to correct any deficiencies.

409. Critique and Oral Assessment - "The Debrief". An effective critique considers good as well as bad performance, the individual parts, relationships of the individual parts, and the overall performance. It should come immediately after a student's

performance, while the details are easy to recall. It may also be useful to first have the SNA conduct a self-critique. This allows the instructor an opportunity to gauge the student's perception of their own abilities and stimulates growth in the student's thought processes and behaviors (and may even remind the instructor of an item they were unable to take notes on during the flight). This form of debrief is known as collaborative assessment. The instructor must use the opportunity to resolve any controversial issues or correct erroneous impressions. Finally, the ATF should be written as soon after the debrief as possible because student performance will begin to blur after the second or third event of the day. At a minimum, supplement the notes taken in the aircraft to ensure the details can be recalled when writing the ATF. If the debrief does not match the ATF, the instructor will lose credibility.

CHAPTER FIVE

FLIGHT INSTRUCTOR TECHNIQUES

500. Overview. This chapter provides some instructor techniques for the Landing Pattern and Emergency Landing Pattern. They are meant only as examples to encourage instructors to develop their own personal teaching techniques. A personal technique begins with the recognition of how you fly a particular maneuver. What are you looking at during each phase of the maneuver? What pressures are you putting on the controls and when? What are you listening to? What are you guarding against? Being able to break your personal techniques into such granular detail will allow you to teach that technique to your student. But remember, techniques may vary, but they all should focus on teaching the underlying procedures required in the FTI. As a professional instructor, you should never say, "I know what the FTI says, but…". If the procedures in the FTI are incorrect, submit a change. Additionally, if you have a particular technique that has proven effective, submit it to the Wing Standardization Officer for inclusion in the next FIG.

501. The Landing Pattern.

1. "Prior to teaching the pattern in the plane, I ensure we discuss it in the brief. That way, the student understands both my technique and terminology before we're in the plane and I lose the teaching aids of pen and paper, non-verbal communication to gauge understanding, or even my hands for that matter. I always work my way through a chalk talk and quiz the student on FTI procedures as we go. They should know altitudes, airspeeds, pattern spacing, etc. and it's a good way for me to gauge the SNA's preparation.

The pattern for me begins abeam the intended point of landing. Everything up until that point is designed to get me to the abeam with the correct spacing, altitude, and airspeed. It's hard to fly a good pattern if you start off of parameters. At the abeam I teach the student to set power at 15 percent (assuming TF setting).

'Set the power, don't guess, don't just pull power. Focus on the torque gauge until you have 15% (even if it takes a few PCL movements). Once 15 percent is set, leave power alone and pitch the nose for 115.' Eventually, the SNA will be able to do these two tasks simultaneously.

After these two requirements are met, the SNA has normally achieved the timing required (4-7 seconds per the FTI) to reach the 180. Additionally, that timing is essential to get the 1200-1500 feet short final required by the FTI.

At this point I talk about a very common student error which is to rush the turn off the abeam position. An early turn eliminates the

appropriate short final. Consequently, there is no way to determine crosswind corrections. Based on the SNA's progress in the syllabus, I may use the opportunity to discuss crosswind corrections at this point.

'Once the power and pitch are set, and I mean set, start your turn and make your call. Once your turn is established, Scan your power and scan your speed. Adjust power and speed as necessary to achieve 15 percent and 115 KIAS. Next check point is the 90. If you are on airspeed and power is set, altitude gives you the only correction you need. If you're above 450 AGL, reduce power. If you're below, add power. Choose a power setting, don't guess. Make a decision, set the power and leave it alone. Normally 3-5 percent difference is all that's required. Now the goal is to get on extended centerline as soon as possible.'

At this point I discuss another common student error, angling in. I draw the concept on the chalk talk and let them know, 'if I tell you you're angling in, this is what I'm talking about.'

'Once on final, put the numbers in the HUD and hold the nose attitude for 3-4 seconds. This allows the pitot static system to stabilize and then scan your airspeed. You are specifically interested in the rate of airspeed change. If it's increasing, too much power, reduce another 3-5 percent. If it's decreasing rapidly, add power. If it's decreasing slowly, your power is probably correct because you want to lose 10 KIAS on short final. The real trick is to make a decision, choose a power setting and then set that power.'

'As the numbers disappear beneath the nose, begin your transition. **Power**, **level**, **idle**, **flare**. Lead with power. This is the only time I guess at a power setting in the pattern as my eyes are looking down the runway. Pull **power** to approximately half of what you think you have set. Then **level** the plane about 5 feet above the runway. Next, power to **idle** (the nose will go left and you will need a little right rudder to keep the nose centered down the runway). Then **flare**, or keep pulling the nose back in an effort to maintain 5 feet above the ground. Eventually, the energy will bleed off and you will touch down in a nose high attitude.'

One of my teaching points is that I only make three power corrections during a normal pattern. Another teaching point is the minimal power change normally required for a pattern altitude correction. I often find student's power corrections are too frequent and too large. I also emphasize the importance of an appropriate short final to determine crosswind corrections. Finally, in the plane, I try to minimize my critiques in the pattern and debrief only trends I am seeing in accordance with, or divergence from, the guidance provided in the brief."

2. "Perform practice breaks at altitude utilizing the CDI or ground reference. This allows more time to provide corrections without

worrying about traffic and allows for immediate resets rather than departing and returning to the pattern."

3. "In order to slow down the required 10 KIAS from final turn to the groove, I reduce power in the groove to "High single-digits." I've also heard other instructors teach 10 percent. Although the FTI is very specific on power settings off the 180, there is no guidance for power settings in the groove. Unfortunately, many students mistakenly think the way to slow down in the groove is to adjust pitch which simply makes for a long landing."

4. "Students who fly with me correct one thing per pass in the pattern. Students who focus on too many corrections tend to be unable to correct any."

5. "On departure, I teach SNAs to treat it like a normal upwind until the plane is clean. This helps prevent over-speeds during OLF departure, a very common check ride failure item. My technique:

a. Clean up flaps
b. Pull power to 60-70%
c. Pitch for 120
d. Raise the Gear
e. Advance power to max, turn away, and call out bound"

502. <u>The Emergency Landing Pattern</u>.

1. "I call this the 'aim point/airspeed' method. The aim point/airspeed method boils down to simplifying energy management, which I feel is the most important aspect of an ELP/PEL, and the least discussed.

I start with a simple question, 'what's the most important point to hit on an ELP; high key, cross key, low key, base key, or touch down?' Most students initially answer high key or low key, but I explain those are checkpoints to get the aircraft in a position to have a good energy state in order to reach the runway. The answer: TOUCH DOWN. The purpose is to land the aircraft!

Gliding to HK, I discuss DEGA, the 30 and 45 degree AOB turns to dissipate altitude, but in the end the most important thing is to get close to a high key position, understand what the winds are doing, and note, high or low on altitude?

High key to low key, I discuss using the altitude and wind information to get to a good 2/3 wing tip distance at low key. I favor wing tip distance over altitude for energy management determination.

Low key to touch down, I discuss energy; aiming the trajectory of the aircraft about 500' short of the runway, and then using the airspeed as a gauge for measuring energy. Airspeed increasing = high on energy, airspeed decreasing = low on energy (it only works if the aircraft is aimed about 500' short of the runway).

It works because the other factors affecting the ELP profile translate into airspeed when you have a constant aim point:

Spacing: wide = low on energy, tight = high on energy. If you are wide, in order to keep the same aim point you would have to raise the nose and the airspeed would decrease.

Altitude: low = low on energy, high = high on energy. If you were low, in order to keep the same aim point you would have to raise the nose and the airspeed would decrease.

Wind: undershooting = low on energy, overshooting = high on energy. If you had an undershooting wind, in order to keep the same aim point you would have to raise the nose and the airspeed would decrease.

It's only important to have a general understanding of these factors since all three will affect the energy state. For example, if you were a little low on altitude, a bit wide on abeam distance, but had a good overshooting wind, they will all factor in to the energy state. If you keep an aim point 500' short of the runway all of these factors combined will translate into airspeed. If the airspeed is increasing then the overshooting wind was more than enough to compensate for being low and wide; and if the airspeed is decreasing, then it was not enough. But the important thing is it gives you one gauge to indicate energy and then you can correct for the high or low energy state. That's it!"

2. "With altitude to lose, I instruct the SNA to fly to high key position first, then begin 360s from high key in order to ensure altitude calculations work out. With 1500' or less to lose, I encourage students to slip and/or take the gear early rather than attempt a 45-60 deg AOB turn. I also teach my students to check the wind vector as they hit high key in order to anticipate how the wind will affect them on the turn to final."

3. "During a simulated power loss, I recommend to our new IPs that if holding flaps UP at low key due to low energy, to not attempt a flaps UP Power Loss landing due to the risk of tail strike."

4. "A common student trend is a slow cross check all the way around. My scan technique is the acronym TAGS.

a. T- Tq
b. A- Altitude
c. G- Groundtrack
d. S- Speed

I say and scan "TAGS" 6-9 times from high key to touch-down in order to keep my x-check honest."

CHAPTER SIX

CONTACTS

600. Overview. The contact stage consists of nine separate blocks of training (including check rides, solos, and night contact) and comprises the bulk of the SNA's primary experience. It is the SNA's first experience with Naval Aviation and the basic principles that will form the foundation of their abilities as a pilot in all other stages/phases of training.

601. C4100 BLOCK (EVENTS C4101 - C4104) - Early Stage Contacts

1. Overview. This is the SNA's first exposure to a naval aircraft. Emphasis should be placed on correct application of procedure, the Power, Attitude, Trim (P.A.T.) concept, landing pattern basics, and standard flow of an event as scripted in the TRAWINGFIVE Checklist Study Guide. All items in the block may be demonstrated by the IP first, particularly on C4101. However, this does not alleviate the SNA's accountability for early contact procedures.

For further information regarding on-wings and recommended "FAM 0," topics, refer to Appendix A and individual squadron SOPs.

2. Common SNA Errors and Tendencies SNA errors at this stage in training will comprise mostly of deviations in BAW, Headwork and Situational Awareness, and lack of sufficient knowledge. They are typically unable to properly employ trim, have an extremely slow scan, and become easily task saturated. All of these combine to produce significant BAW deviations. Such deviations, particularly during Out Lying Field (OLF) operations can result in dangerous situations that may endanger the aircraft or create hazardous situations with other aircraft. IPs must be extremely vigilant at all times. Some SNAs will be behind procedurally and lack sufficient knowledge to enable effective instruction. SNA preparation expectations should be readdressed in this situation.

3. Instructional Tips.

a. The primary instructional focus of the C4100 Block is familiarizing the SNA with the aircraft and correct application of procedures. Showing SNAs the standard solo profile is of less significance and will only serve to further overload the SNA. Attempt to focus your instruction and compartmentalize for the SNA.

b. In order to limit working area and OLF saturation, the events in this block are typically conducted in airspaces where SNAs will not conduct their solos. Likewise, low work is typically conducted at non-solo OLFs and nearby civilian fields.

c. Instruction in the brief and during the flight should emphasize readying the SNA to fly off-wing in the C4200 Block. Proficiency with the NATOPS brief, ground ops, and EPs/Limits memorization are all crucial prior to the next block of training.

d. Emphasis must be placed on FTI and FWOP knowledge early in order to enable effective instruction in the air. SNAs must understand the necessity of proper study and preparation so that instructional time in the aircraft may be maximized.

e. IPs should demonstrate and ensure continual focus on the P.A.T. concept throughout all phases of flight. Acting as Air Traffic Control (ATC) and vectoring the SNA around the working area with climbs, descents, and turns of varying degrees of Angle of Bank (AOB) will all serve to benefit the SNA's ability to execute transitions and make effective use of trim. Asking an SNA to "show you their hands" during various phases of flight is an effective means of evaluating aircraft trim.

f. Encourage the SNA to look outside the aircraft. An SNA's attention will become consumed by his instrumentation or Tactical Situation Display (TSD), often to the severe detriment of his Visual Flight Rules (VFR) scan. Stress an integrated outside/inside scan that utilizes the tools inside the cockpit to inform the SNA's outside situational awareness. Dimming a student's displays or forcing them to only look outside during basic airwork drills will help them to develop a truly integrated scan. A discussion and demonstration about the inherent lag of the pitot static instruments may also help to emphasize the importance of setting the attitude of the aircraft by looking outside.

g. Force the SNA to slow down. Too often your SNA will attempt to rush through high work maneuvers resulting in poor BAW and a lack of true command over the plane. Force your student to stabilize on an altitude, airspeed, and heading (if warranted) prior to executing a maneuver. Enforcing strict BAW standards in the high work will payoff tenfold at the OLF.

h. Practicing low work maneuvers at altitude in the high area will reinforce procedures and provide context. Treating the Landing Pattern Stall as if you were actually in the pattern, or simulating the break at altitude are effective ways to practice low work maneuvers in a more relaxed, less constrained environment.

i. SNA's Situational Awareness will generally be at its lowest during this block of training. Stress the importance of listening to the radio, especially at the OLF, as a way to enhance their SA. Conversely, the IP's SA must be at its highest during these events. DO NOT COUNT ON THE SNA TO ASSIST WITH SAFETY OF FLIGHT!!!

j. A dedicated and thorough pattern brief is essential to ensure the SNA understands the construction and fundamentals of the pattern. Set aside a portion of the brief to talk through the entirety of the pattern, from entry to departure. The SNA should know the procedures in the FTI. This is an opportunity for the instructor to provide any personal techniques that may assist the SNA in execution.

k. This early in training students will often be unable to fly AND listen to instruction. Do not hesitate to take the controls in order to allow the student a moment to think and listen. This is especially useful in the pattern when debriefing the previous pass.

602. **C4200 BLOCK (EVENTS C4201 - C4204)** - Mid-Stage Contacts

1. Overview. This block introduces the SNA to Emergency Procedures and the Emergency Landing Pattern. Emphasis should be placed on execution of memory items and sound decision making when dealing with emergency scenarios. All Contact maneuvers will continue to be flown with the general exception of the turn pattern, level speed change, and slow flight, which are not required by the JPPT and will not be evaluated during C4490. SNAs will begin flying off-wing events. Finally, SNAs should be able to SAFELY land the airplane, safely execute a PPEL(P), get into/out of an OLF safely and safely get established on Course Rules before leaving this block.

2. Common SNA Errors and Tendencies.

a. SNA's will continue to make errors similar to the C4100 block, but will also struggle with maintaining aircraft control while executing memory items and dealing with simulated emergencies.

b. SNAs will tend to incorrectly prioritize Aviate, Navigate, Communicate tasks when faced with a simulated emergency, overly focusing on memory item execution over safely flying the airplane.

c. SNAs often lack sufficient situational awareness to find and navigate to the nearest suitable field when initiating a Precautionary Emergency Landing (PEL) or forced landing and struggle with deconflicting other traffic while executing.

d. SNAs will struggle with the energy management required of simulated power loss or PEL scenarios, both in and outside of the pattern environment. Calculating Dead Engine Glide Altitude (DEGA), reassessing their profile and dealing with a surplus or deficit of energy introduces all new skills to master.

3. Instructional Tips.

a. C4200 Block events should be flown following a standard solo profile.

b. Event profiles should incorporate items from the SNA's maneuver tracking card in order to help ensure the SNA is exposed to as many of these maneuvers as possible prior to progressing to the C4300 block when check ride prep is the priority.

c. When introducing simulated emergencies, stress the tenets of maintaining aircraft control, assessing the situation and taking appropriate action, and landing when conditions permit.

d. IPs should attempt to minimize the radio comms required of the SNA when dealing with simulated EPs early in training. Waiting to introduce EPs until clear of controlled airspace, making the inbound call to the RDO, and handling PEL pattern comms are all ways to unload the SNA during early EP training.

4. Recommendations. See Chapter 9 for specifics regarding defensive positioning.

603. C4300 BLOCK (EVENTS C4301 - C4304) - Late Stage Contacts

1. Overview. All Contact maneuvers should be practiced and reviewed in this block. Emergency procedures, headwork, FWOP scenarios, and fine-tuning of pattern work should be the focus to prepare the SNA for the C4490 check ride and solo. SNAs are typically proficient with high work at this point and instructional time may be minimized in the high area in order to focus more attention on area management, EP, and OLF training.

2. Common SNA Errors and Tendencies. Errors tend to become less exaggerated as the SNA gains confidence and becomes more proficient with flying the aircraft. However, as the IP interjects less and more is expected of the SNA with regards to running the event and managing the area, many SNAs will struggle with this new level of responsibility and ownership over the flight.

3. Instructional Tips

a. Flights in this block are flown to the high areas and OLFs where the SNA may expect to solo. Event sequence should be focused on check ride preparation.

b. **Force the SNA to drive the event!!** IPs should increasingly treat these events like mock check rides. Force the SNA to make decisions, allow them to make mistakes; do not bail them out by providing the answers to their questions. Instead, ask them what they would do on their solo and help them to sort out their decision making early.

c. The difficulty and intensity of Simulated Emergency training should be increased. Simulated EPs should be introduced at more challenging phases of flight. Below are some sample scenarios:

(1) PEL during the crosswind break
(2) PEL from the initial
(3) PEL on takeoff from NSE
(4) PEL while transiting to the NMOA, prior to high work
(5) PEL while on course rules

d. Typically, C4301-3 should be the most challenging events of the contact syllabus for SNAs. C4304 should be a dry run of the SNA's check ride and should serve to build their confidence heading into C4490.

604. C4490 Initial Contact Check Ride.

1. Overview. This is an evaluation flight that determines the SNA's ability to safely solo the T-6B during C4501. Instruction may be performed by the IP, but not at the expense of effective evaluation.

2. Common SNA Errors and Tendencies.

a. Safe area management: Not violating airspace they have not cleared; not flying across/through course rules airspace in a hazardous manner; safely departing the high area and navigating to the OLF.

b. Safe OLF entry/departure: Lining up on the correct runway; taking discontinued entries when warranted; breaking with proper interval; executing a safe OLF departure; at no time risk over-speeding the gear/flaps.

c. Safe OLF Ops: Maintaining a proper interval at all times. Landing in the touchdown zone. Maintaining BAW parameters in the pattern. Executing waveoffs when appropriate. At no time risking over-speeding the gear/flaps.

d. Safe homefield arrival: Following appropriate courses rules using VFR ground checkpoints as a primary means of navigation; staying north of Langley road; breaking with proper interval; maintaining break altitude until abeam the upwind numbers; executing a discontinued entry when appropriate; executing a safe full-stop landing.

3. Instructional Tips.

a. IPs should instruct SNAs to treat this event as though it were their solo. If asked a question by the SNA, the best answer is typically "what would you do on your solo?"

b. This event must be flown to the Areas and OLFs where the SNA is expected to solo.

c. Say less, observe more. If the SNA's on-wing has done their job, the SNA should be comfortable with the reduced IP interaction.

d. C4490 flight profiles should be based on C4501. An SNA is almost certain to enter the OLF via the initial on the solo flight. Therefore, ensure the SNA enters the OLF via the initial on the check ride. A PEL may always be flown subsequently.

4. Grading/Evaluation Tips.

a. Determining whether or not an SNA can safely solo the aircraft is important. However, IPs must also remember that the C4490 is also its own block of training and therefore all maneuvers must meet MIF in order for a SNA to successfully pass. For example, if the entirety of the flight is completed safely, but the SNA cannot perform a Power-on Stall to MIF, the SNA should not pass the check ride.

b. Immediate re-fly. The C4490 is an intimidating event and will be the first real inflight evaluation that most SNAs have encountered. SNAs will be understandably nervous, anxious, and sometimes self-doubting. As the evaluator, an appreciation for this apprehension is required. Often times a nervous student will commit an error they never have before or will struggle with tasks that they previously found routine. As such it is not uncommon or unexpected to allow a student to reattempt a maneuver they fail to fly satisfactorily. Typically, a second attempt is all a slightly nervous SNA needs to confidently demonstrate that they are capable of performing to standards. If a second attempt is failed, then perhaps the SNA is too nervous to perform or lacks sufficient ability and should be graded accordingly. Remember, during their solo, SNAs will only have one attempt to perform many tasks successfully. Failure to do so could produce dire consequences without an IP in the back to bail them out.

c. Recognizing the errors. When assessing the SNA's performance and attempting to decipher whether nerves or lack of ability are at play, often times the telling factor will be whether or not the SNA recognizes that they have erred. If an SNA can say, "Ma'am, that was bad, I can do better," or "Sir, we aren't going to make it, I would eject," then at least they comprehend and can diagnose the error and make an appropriate decision. The real issue arises when an SNA doesn't realize the deviation and therefore cannot make an appropriate correction. For example: SNA is off of course rules and doesn't recognize it resulting in getting lost; SNA is lined up on the wrong runway and doesn't discontinue; SNA doesn't realize a forced landing won't make the runway and continues, etc. In cases such as these, it should be evident that the student is not capable of safely meeting MIF.

d. Death by a thousand cuts. Typically, a SNA will UNSAT C4490 due to a number of small mistakes or shortcomings rather than one unrecoverable deathblow of an error. This can make it difficult for the IP to pass an overall judgment on the flight as the SNA continues to place small pieces of doubt in the IP's mind, but nothing so obvious as to make the decision obvious. In this case, **withhold your judgment and indicate nothing to the SNA as to the outcome of the flight**. Often a quick review of CTS or a second (and sometimes a third) opinion from another IP will help to put the event in context.

e. If in doubt, there is no doubt. When making your decision to PASS or UNSAT a student, remember that you will bear partial responsibility for the outcome of the SNA's solo. Waiting anxiously for a questionable SNA to call back safe on deck following their solo is not comfortable. It is the job of the SNA to demonstrate beyond doubt that they have the ability for solo flight. If they don't, do not grant them an allowance. Bear in mind that they will be sharing airspace with you and your fellow instructors. The stakes are too high for them to be there unprepared.

f. Continuing the failed flight. In the event that an SNA provides sufficient inflight evidence that they cannot pass the C4490, provide no indication that they have failed and attempt to continue the flight. At this point in the event, the instructor can transition from evaluation to instruction. The additional repetitions and practice that ensues might be the added push that the SNA needs to successfully pass their next attempt at the Initial Progress Check (IPC), or might uncover some additional shortcomings that warrant documentation and correction. Either way, once you make the decision that they have not passed, do not reverse yourself, regardless of what transpires afterwards.

g. On-Wing Feedback. Most IPs will be eager to hear how their on-wing fared on the check ride. As a Safe for Solo check pilot you will have the unique opportunity to provide that IP with feedback on their student's performance that may refine instructional techniques and improve the future preparation of their students. "Closing the loop" with on-wings is an important responsibility of the check pilot.

605. C4600 BLOCK (EVENTS C4601 - C4604) - Aerobatics

1. Overview. SNAs are introduced to Aerobatic Flight. Continued proficiency with basic contact flying is mandatory, though less time is typically required for these items.

2. Common SNA Errors and Tendencies.

a. SNAs vary greatly in their enjoyment of and aptitude for aerobatics.

b. SNAs will initially struggle to complete maneuvers with the proper energy exchange, especially with energy neutral maneuvers.

Loss/gain of altitude and airspeed are common as are heading deviations.

3. Instructional Tips.

a. SNAs are not typically required to execute touch-and-goes during their C4801, so operating at solo airfields is not essential and not recommended. However, pattern work should not be overlooked, as safe pattern operations is essential in passing the C4790.

b. Power Loss will be required on the C4790. Therefore, ensure PEL and Power Loss procedures are included as part of the profile.

c. Emphasis should be placed on looking outside the plane to the max extent possible to utilize ground references and section lines.

d. Airspeed management is crucial to safe execution of aerobatic maneuvers and should be consistently reinforced.

e. Contact unusual attitudes should increase in difficulty and should mimic a situation students might encounter during aerobatics (ie, nose high, low airspeed that might be encountered during an over-the-top maneuver or nose low, max power that might be encountered if the SNA gets disoriented during a barrel roll).

f. Flights in this block will typically consist of Out & Ins to civilian fields, which must not come at the expense of the SNA's exposure to course rules. Practicing course rules prior to transiting to another airfield is critical to ensure an SNA will be check ride ready.

606. C4790 Aerobatic Check Ride.

1. Overview. This is an evaluation flight that determines the SNA's ability to safely solo the T-6B during C4801. Instruction may be performed by the IP, but not at the expense of effective evaluation.

2. Common SNA Errors and Tendencies. Errors are typically the same as observed in earlier blocks of contacts.

3. Instructional Tips. See C4600 block for discussion.

4. Recommendations. IPs should emphasize safe accomplishment of aerobatic maneuvers and unusual attitude recoveries. Reference Section 604. C4490 Initial Contact Check ride for additional guidance on contact check rides.

607. C4901 Night Contact.

1. Overview. This event is designed primarily as initial exposure to the night flying environment.

2. Common SNA Errors and Tendencies. SNAs have difficulty adjusting to normal maneuvers at night. They are much slower performing all maneuvers. SNAs have difficulty judging closure rates, ground speed, drift, etc., due to degraded visual cues. SNAs often struggle with executing ELP maneuvers at night due to the lack of visual cues to correlate with them being on or off profile. Students may initially struggle with landing the aircraft if significant time has elapsed since they conducted landing pattern work, but they typically warm-up quickly.

3. Instructional Tips.

a. The FTI and FWOP offer minimal material to help expose the SNA to night flying, so supplementing from the IP's Fleet experience is critical.

b. This flight is generally more relaxed in nature due to its singular existence in the syllabus. However, SNAs are still accountable for coming prepared and ready to discuss nighttime flying. This flight should consist of a fair amount of show & tell.

c. Attempt to take the SNA to both towered and non-towered fields to expose them to the differences in environments. This may be their first experience with items such as pilot-controlled lighting, Approach Lighting Systems, and even civilian style radio calls, so model flight profiles in order to show the SNA as much as possible.

d. Cockpit lighting should be discussed thoroughly prior to and during the Night Contact Event. Location of switches as well as techniques to improve night vision are often new to the SNA. It is not uncommon for an SNA to set their lighting to maximum brightness and not revisit during the event.

e. IPs should be especially cautious when operating at unfamiliar fields since the hazards of the tree line on final and departure are difficult to identify at night. Not all small civilian airfields have adequate lighting to aid in the recognition of these hazards.

CHAPTER SEVEN

INSTRUMENTS

700. Overview. The instrument phase consists of four blocks that build on each other. The students will start with learning proper flight planning. It is recommended that IPs expose the SNAs to DD-175s, jet logs, contract fuel websites, all NOTAMS including GPS databases, and proper weather briefs. In flight, the students begin with learning to interpret the "raw data" (needles and DME). By the second block they progress into using the FMS but should still be tasked on each event to perform a point-to-point with raw data. Students typically perform a minimum of three approaches (at least one full procedure) and holding on each event. Of note, if homefield is VFR, instrument approaches at KNSE are discouraged between 0900-1500 and should be held to an absolute minimum.

701. I4100 Block (Events I4101 - I4104).

1. Overview. In this block, the SNA is building the foundation for operating in the IFR environment. Emphasis is on developing skills for instrument procedures while refining trim and BAW skills. The emphasis for this block is raw data and SNA FMS usage should be minimal as SNAs have yet to receive training on the FMS at this point in the syllabus. A common instructor technique is to have the SNA monitor the frequency page on the left MFD. Additionally, the SNA's ability to manage cockpit workload and prioritize tasks may be lacking at this stage. Instructor assistance may include taking the controls briefly to aid in cockpit management or handling the communications to allow an emphasis on instrument flying early in the block.

2. Instructional Tips. There are plenty of approaches within 250 miles of Whiting. Some local area recommendations are:

a. Cairns (KOZR) PARs - Avoid during 1000-1400 recovery window.

b. Crestview (KCEW) - Uncontrolled airport; check-in with Eglin Approach and monitor their freq. Great VFR option for I410X; close proximity to KNSE allowing for 3-4 approaches plus holding. Maintain vigilance and do not rely on Eglin approach for traffic separation as approach controllers are often students under instruction. Also, frequently a high volume of helicopter traffic in vicinity.

c. Mobile (KMOB and KBFM) - Numerous approach options and close proximity allows ample time for multiple approaches and holding. ASRs are available, but limited staffing often results in missed opportunities (ASRs can be accomplished back at NDZ if MOB turned you down).

d. Pensacola NAS (KNPA) PAR, ILS, RNAVs - Avoid during 0800-1500 daily. Recommend rehearsing MA instructions with SNA prior to flight (Runway heading 800', at 2 DME turn 180 and climb to 1,500').

e. Tyndall AFB (KPAM) PARs - Recommend calling ahead to avoid being turned away for congestion.

f. Troy (KTOI) PARs - Less congestion than TRACON.

g. Gulfport (KGPT) ILS, Arcing VOR, ASR - Less congested than KMOB.

3. Recommendations. Students are just learning the correct prioritization required for proper instrument flying. Taking the time to demonstrate an approach while verbalizing your actions, including details such as your instrument scan, may prove extremely beneficial to the student. Additionally, the concept of "magnitude" and "duration" of corrections may help the SNA conceptually. For example, to correct from one dot low on an ILS at 10 miles requires a larger magnitude power correction and/or a longer duration of power addition than correcting from one dot low at 2 miles. Also, having the students say the 6Ts and D LIDS will ensure they know the procedures and execute them at the correct time. It is highly recommended to operate VFR in the local area as weather conditions permit to allow students to make mistakes and provide more room for error. However, added vigilance is necessary by the instructor as ATC is no longer primarily responsible for aircraft separation - the instructor is. For SNAs struggling with real-time ATC instructions, consider taking them to a non-controlled airport environment with you acting as ATC. This will allow for timely, uninterrupted conversation between you and the student. You can even perform a wide variety of approaches at altitude by adding several thousand feet to the minimums. For example, you can position yourself over KMVC with 116.8 tuned, pick any VOR approach the SNA needs and just add 5,000' to all the published altitudes. PARs can be difficult outside of the local area. As a last resort, PARs can be simulated with the IP acting as the controller, providing glideslope and course guidance based on the student's BAW relative to an ILS.

702. I4200 Block (Events I4201 - I4204).

1. Overview. The SNA will continue to practice and improve their RI skills. Communications should show marked improvement from last block with little to no assistance required. FMS usage is allowed, but raw data remains the primary tool for instrument navigation. Remember, the SNA may not have an FMS in their follow on aircraft. Flight planning is also emphasized in this block. SNAs are required to complete a jet log, DD-175 and obtain a DD-175-1 weather brief for all events in this block.

2. Instructional Tips. The instructor should focus on task management (Aviate, Navigate, Communicate), especially in light of the added complexity of the FMS.

3. Recommendations. For the no-gyro approach, IPs can simulate this scenario by selecting night on the UFCP and then telling the SNA to

brighten just the right MFD for engine instruments. Practicing Point-to-Points (PTP) using raw data then using the FMS as a back-up will continue to build a strong foundation for the students. Significant improvement on PTPs can also be made by operating VFR in the vicinity of a VOR, where the IP keeps giving the new radial/distance scenarios for the SNA to practice initial turns to intercept. An SNA can execute 10-15 PTP scenarios in a few short minutes.

703. I4300 Block (Events I4301 - I4305).

1. Overview. This block refines approach procedures and enroute navigation. You are prepping the SNA on what to expect on I4490.

2. Instructional Tips. IPs should instill the proper knowledge regarding filing flight plans and retrieving and understanding weather briefs while away from home field. Reviewing IFR Low Altitude Charts and Approach Plates that are used every flight as well as the governing documents (e.g., AIM/FAR, OPNAV 3710, General Planning, NATOPS, etc.) will help clear up any misunderstandings and provide the SNA with the tools for retrieving IFR information. Ensure the SNA is using the Jet Log to track fuel remaining along the route. Encourage discussion of factors that may result in differences (especially shortfalls) and how they might affect the flight.

3. Recommendations. During event briefs, IPs can query SNAs with scenario-based questions regarding flight regulations, lost communications, icing, airspace, and emergency procedures. SNAs tend to struggle with translating the book information into real-world situations. Recommend discussing the difference between handling EPs in IMC vs VMC conditions and the differences between FIH and local lost communication procedures.

704. I4490 Block (Event I4490) - Instrument Check Flight

1. Overview. This block is the instrument check for students. While not a NATOPS instrument check flight, the SNA should be familiar with all applicable procedures and be able to execute the entire flight with little to no assistance.

2. Instructional Tips. Field selection should allow for a variety of approach types while allowing ample transit time for approach preparation, FMS set-up, etc.

3. Recommendations. Thoroughly cover EPs in the brief as you will typically not get a chance to evaluate this in flight.

705. FTI Holding Correction Explained

1. Overview. Consistent BAW is essential for accuracy in steady state wind conditions. Any deviations of airspeed, bank angle (during

turns), heading control and inbound tracking will either add to or negate actual wind effects making accurate wind assessment and corrections difficult at best.

2. Instructor Tips. Determining the inbound tracking solution once established on the holding course is the key concept for this procedure. It provides the basis for the initial outbound correction heading. The sooner the inbound solution can be determined, the sooner the outbound correction can be applied.

3. Explanation. The initial outbound heading correction of triple the inbound drift corrected heading (inbound crab angle) is intended to compensate for the radius of turn differential caused by a crosswind component. One minute on that heading is used because that is the time it takes to make the 180 degree turn outbound at standard rate (the time that radius of turn is being affected by the crosswind). Holding the triple drift correction for one minute will place the aircraft in a position so the inbound SRT will have the proper radius of turn to finish on the holding course. If the outbound leg will be more than one minute, it is imperative that the single drift be used for the remaining portion of the outbound leg.

706. Cross-Country Operations.

1. Overview. Cross-country trips are a great opportunity to introduce students to real world instrument navigation. The following information is provided to set the IP and SNA up for the best training and experiences possible. Remember, the SNA is observing EVERYTHING the instructor is demonstrating on the cross-country. Ensure you are providing a good example of a Naval Aviator and Officer.

2. Pre-Flight Planning. The best way to make sure both the IP and SNA get the most out of a CCX is to plan ahead as much as possible.

a. Admin. The further ahead of time one makes reservations, PPRs, and coordinates with Admin and Ops the better. Do not count on the students alone to plan the CCX or you can face some lengthy delays on the day of departure. Some locations require PPRs well in advance. Key West is a popular spot requiring a PPR. Some locations do not require a PPR, but do require prior notice. Some locations sneak in a ramp fee that could have been waived with prior communication.

b. Fuel Planning. When choosing intermediate and final destinations, consider that each leg of the CCX is typically no more than 400 miles. This will allow sufficient fuel for the required approaches, holding, and alternates as appropriate. CNATRA requires an alternate for all flights regardless of weather. You can refer to OPNAV 3710 regarding the guiding principles to ensure you have sufficient usable fuel, considering all meteorological factors and mission requirements. Plan to be on deck with no less than 200 lbs. One technique for max duration is topping off via over-the-wing refueling just prior to pre-flight. This will allow for an extra 100

lbs of fuel as opposed to just pressure refueling while avoiding fuel leaks created by fuel expansion if performed too far in advance.

c. Resources

(1) www.skyvector.com can assist in basic planning of routes.

(2) https://aircardsys.com/cgi-bin/fbo_locate is the website for finding civilian airfields with DLA energy contracts.

(3) www.baseops.net is a website with a large amount of tools for CCXs.

(4) https://portal.fnmoc.navy.mil/opars-ufs/ is a website that can assist in providing historical data as well as current forecasted information for accurate flight planning. Specific offerings; temp, winds aloft, TAS/GS, best altitudes, etc for an entire route. *CAC required

(5) www.fltplan.com can provide many helpful planning resources. They even have a free app called "FltPlanGo" that rivals ForeFlight.

d. Brief Items. Attempt to brief the SNA prior to the departure date. The amount of briefing items can cause a serious headache if not planned beforehand. An in depth brief of approaches to be conducted as well as where holding and point-to-points will be executed is crucial to the success of the student. Try to avoid expecting SNAs to "wing it" or "play it by ear." Primary instrument training is an introduction to instruments and the capabilities of the SNAs at this point should not be taken for granted.

e. Pubs. Make sure you have the most current and correct pubs. STARS and High Enroute charts as well as Low Enroute charts may be needed for some CCXs. The FIH, VFR/IFR supps and TCNs can often be overlooked. Have pubs for potential diverts as well. Lastly, ensure you have a set of orders.

f. Available syllabus events

(1) I4201-I4490 (I4101-I4104 for a first block CCX).

(2) N4101 & N4201.

(3) C4901.

3. Enroute.

a. Plan accordingly for PARs and ASRs. These approaches can be the hardest to find on the road. Mix and match approaches as you see fit.

b. Substituting VNAV events could be advantageous.

(1) If weather does not support an IFR profile, a VNAV could suffice. Ex. SIGMET precludes filing IFR; N4101 is an option provided you remain clear of clouds within VFR requirements.

(2) Due to a lack of approaches at certain locations, some legs could be better suited for a VNAV event.

c. Filing

(1) Base Ops at Military facilities.

(2) 1-800-WX-BRIEF from any civilian fields.

(3) FSS.

(4) ForeFlight app.

d. Flight Following. Ensure you are updating the FDO/CDO/SDO on each leg of your trip in accordance with squadron SOP.

4. Post Flight.

a. You may be tired, but Ops/scheduling needs to know what events were accomplished over the weekend. IPs should complete ATFs to the maximum extent possible, but if crunched for time, one technique is opening the ATF and checking the appropriate box (Unsat/Marg/Pass). Also recommend adding a comment of "Comments to follow" prior to clicking submit. This will allow Ops to see the event as complete in TIMS while writing the schedule Monday morning. Just don't forget to complete the ATFs the next day as these SNAs are usually completers.

b. Ensure the NAVFLIRs are appropriately filled out.

(1) Times, dates, locations, and appropriate events.

(2) Simulated/actual time, night time and approaches.

c. Refer to squadron SOP regarding filing Travel Claims.

CHAPTER EIGHT

FORMATION

800. OVERVIEW. This will be the student's first exposure to section operations. Most students will be paired up with another student to progress through the Form syllabus as "Form Partners." This particular aspect needs to be emphasized with the students. Section integrity is a principle that applies to both students preparation for the brief and flight as well as in-flight situations.

Note:

Students may or may not have completed the instrument stage before formation. If they have, quiz them on a proper VFR scan, airspace, PEL, PEL/P and pattern procedures since they may not have thought about that in a while. Also, quiz their NATOPS, GK, and EPs to prepare them for their solo. Ensure they have passed their form exam.

801. F4100 BLOCK (EVENTS F4101-F4103).

Overview: With no formation experience, the students will struggle with aircraft control. However, they should know all FTI and FWOP procedures, and have an understanding of how to initiate corrections.

F4101:

Brief: The first formation brief may require up to an extra hour to cover every aspect of the flight from the walk to aircraft to shut down. Normally the Section Leader will demo the brief, but students are always responsible to be able to brief any item on the briefing card if asked.

Flight: A common technique on F4101 is for the instructor to demonstrate formation specific maneuvers prior to the SNA attempting. On all flights thereafter, demo as needed, but expect to talk the student through proper corrections. Don't let the students remain too far out of position. Take the controls as necessary and reset them in good position so they get practice flying the actual checkpoints. Never let them accept being sucked or acute. The common tendency is for a new student to fly in the sucked position.

IPs typically mirror all hand signals on this flight.

F4103: Student ability will vary greatly in the formation stage of training. Some students will progress much more rapidly than others and have a very good feel for formation flying by F4103. Other students may need the entire syllabus to ensure they are safe for solo. As an instructor, you should work to ensure both are receiving value added instruction through all events.

802. F4200 Block (Events F4201 and F4202).

Overview: Students will generally show vast improvement in this block. They will be more comfortable and relaxed with form flying and are usually weakest at basic contact concepts such as course rules, PEL procedures, and landing pattern.

F4201:

Brief: Special consideration should be given to how the flight will be split for PEL work and how it will be rejoined after pattern work.

Flight: If the student just finished the instrument stage, this may be the first ELP and landing pattern practice in months so expect to provide extensive coaching.

803. Maneuvers & Instructor Techniques.

1. General. Be patient. Give the student ample attempts at each maneuver. If BAW is rough, take the controls and check their trim. If it is good, then bad BAW is probably due to an anxious student squeezing the stick too hard and over-controlling the aircraft. Flying with their fingertips may fix the problem. Other techniques include having the SNA "wiggle their fingers on the stick or wiggling their toes in their boots." The above are just two examples, but any technique used to relax the student should improve their BAW if anxiety is the problem.

There are various techniques to teach a student about the control inputs required to fly formation. If a SNA is having difficulty controlling all parameters at once, one technique is to maintain control of either the PCL or the stick and allow the student to manipulate the other control to reduce the complexity of the inputs required. If the instructor chooses to use this technique, it is imperative to be very clear during control changes exactly who is flying the aircraft.

Students will tend to fixate on one checkpoint, namely the UHF antenna. Have them scan all the checkpoints and the whole aircraft including the pilot. Keep Lead aircraft in the same general area on the canopy. If the tendency is to be sucked, the student will be looking at Lead through the front windscreen. When on bearing line and sitting naturally, the student should be looking through his side canopy glass to keep Lead in sight.

Mission Crosscheck Time (MCT) is a very important concept during the formation syllabus for not only the student, but also the instructor. MCT is the maximum feasible time, which a pilot can safely divert attention from scanning the Lead aircraft in order to attend to administrative items (data entry, radio switches, etc.). As the winged instructor, MCT should be used to evaluate your own flight parameters. This is not only essential for safety of flight, but can also be used

to inform your instruction for the SNA (i.e., rudder trim out or improper power settings).

Although not captured in the FTI, a common practice in the formation syllabus is to limit Lead to less than max power and greater than 0% torque. An example would be to limit Lead to 90 percent maximum power and 10 percent minimum power to ensure Wing has sufficient reserve to maintain or regain position.

2. Ground Operations. Take a moment in maintenance control to discuss a plan to join the flight if not parked in close proximity.

After strapping in and turning the battery on, put the VHF Tactical frequency in. If parked in close proximity, a thumbs up initiated by Lead with a thumbs up in response from Wing is sufficient to initiate closing the canopy. If not visual;

LEAD (VHF): "TAC CS Ready Canopy"

WING (VHF): "Two"

LEAD (VHF): "TAC CS Close Canopy"

At home-field, common practice is to taxi in trail to the run-up and stagger taxi to the runway.

After the Over-speed Governor Checklist consider requesting the IP of the other aircraft to demonstrate flaps out of position or securing exterior lights to stress the importance of a good check for mutual support.

3. Takeoff. The takeoff sequence is a common place for SNA confusion and can delay the flight excessively on the runway. Discussing this sequence in detail in the brief and having the students practice may alleviate some of the confusion on the runway. Teach the student to get the winds figured out early, but no later than the hold short. If they wait until it is time to take the runway they will likely forget to finish the line-up check list. The wind sock will point to the side that Lead should be on.

Make sure Wing student is including Lead aircraft in their scan during takeoff roll.

4. Running Rendezvous. You will most likely have to remind the Lead student, several times, to set 80 percent torque and maintain 160KIAS. Remind Lead that abiding by these parameters is crucial to Wing being able to execute a proper running rendezvous. Consider instructing student to utilize the speed bug during preflight checklists.

Ensure Wing starts the join with Lead slightly above the horizon and outside the HUD FOV. Most students will have a tendency to drive straight toward the back of Lead. To fix this, in the brief, draw the

desired flight path of Wing throughout the running rendezvous. Emphasize that Wing should drive straight forward, relative to Lead, until intercepting bearing line. If done correctly, the Lead aircraft will appear to walk aft on Wing's canopy and at no time should move toward the HUD. All corrections for closeness should take place ONLY when Wing is established on bearing line.

Another technique is to "hide" the Lead's exhaust stack at 4-5 plane lengths and then start to see it "peak" out of the bottom of the wing at 2-3. This will ensure proper step down throughout.

DEPARTURE: The use of the acronym CTAF may be helpful in organizing the student's transition from the running rendezvous to the working area. CTAF stands for Cruise, Terminate advisories, Area coordination, and Fence in.

COMMS: The use of civilian fields, NMOA, or SMOA will require the flight to swap tactical frequencies. The following example is provided:

LEAD (VHF): "TAC CS push uniform TAC."

LEAD (UHF): "TAC CS"
WING (UHF): "Two"

LEAD (UHF): "TAC CS push ____ on victor."

LEAD (VHF): "TAC CS"
WING (VHF): "Two"

5. Joker/Bingo. The flight should depart with the briefed Joker fuel set into the bingo bug then reset it to split the useable fuel after FENCE in. When Joker is reached by either aircraft, report it over the TAC frequency. After the first lead change, Lead should direct the flight to reset Bingo. Both aircraft will reset new bingo bug setting at the same time, regardless of who reaches the pre-set value first. If you hit Joker when you are already in the pattern or Bingo when you are half way back on course rules there is no need to make a call. Just reset to the next briefed fuel or as required to ensure you comply with FWOP and NATOPS regulations.

Joker calculation technique: $\frac{(Current\ Fuel+Bingo)}{2} = Joker$ $\frac{(950+400)}{2} = 675$

6. Parade / Turns. Instructor parade check points: Slightly different than the FTI based on sitting in the back seat. A common set of check points include, Prop arc on fuel vent; UHF on fuel vent, exhaust stack tangent.

When demonstrating corrections start in the order you would expect the student to make corrections, namely: Step down (high/low), Bearing (Sucked/Acute) & Closeness (Near/Far).

Advanced students may be further challenged with linked turns or 45 degree AOB turns although these are not graded items. Alternatively, consider decreasing the number of turns if up to MIF to allow time to work the landing pattern or cruise/tail chase demonstrations.

7. Break-up and Rendezvous. The FTI requires a 3 second break, but some students count differently and some break with different G loading. Another technique is for Wing to wait until Lead passes the 3/9 line to break. A common Wing error during this maneuver is to look inside during the break and lose sight of Lead.

a. Break-up Portion. Most students do a weak pull, resulting in excessive airspeed and large altitude deviations.

Wing should roll out with Lead on or slightly below the horizon, however most students misinterpret "slightly below." Don't let them stay excessively stepped up as this will put them in an artificially high energy state during the join while they try to get back down to the proper altitude. Catching this error early will increase the student's chance for success.

One technique to avoid excessive speed on roll-out is to teach the student to "lead with power," or pull power first before unloading the plane and rolling wings level. This technique works well for both Lead and Wing. Another way to teach airspeed control is the idea that angle of bank controls altitude and pull/g-loading controls airspeed.

b. Rendezvous Portion. The FTI explains the stick to stab method but this concept sometimes confuses students. Remind them that if the tail goes left, the stick goes left. If the tail goes right, the stick goes right. Remind Lead that Wing's success largely relies on Lead flying the briefed altitude, airspeed, and angle of bank.

Emphasize to the SNA that sucked corrections will take longer to develop than acute corrections. Also, during acute corrections angle of bank often only needs to be relaxed and rarely reversed. Additionally, a discussion in the brief about heading differential may clarify the procedure for some students.

c. Join-up Portion. Judging one to two T-6 wingspans is hard. Better to start the join-up phase a little early rather than get too close.

Make the students understand that if Lead is at 30 AOB, Wing will have to decrease his AOB for the proper "V". Power and nose adjustments are almost exactly like those used in the stepdown portion of the cross under. Students should understand they are controlling relative motion in three axes all at once.

To stabilize in the join-up position, Wing needs to add power to stop the descent rate, raise the nose slightly, and increase angle of bank slightly greater than leads angle of bank momentarily to stop relative motion, then match Lead's angle of bank to stabilize.

Once stabilized in position, go out and up "like a J" to the VFR turn away position. Lead this part of the maneuver with power or the aircraft will get sucked.

d. Underrun.

Lead - Monitor Wing throughout the join and always be prepared to take evasive action if needed. If Wing IP is doing a good job, you should never need to execute, but always be prepared.

Forced Underrun: IP takes the controls of the Lead aircraft and slows the plane to 180 KIAS after Wing is established on the bearing line by pulling power to 30 percent. Once at 180 KIAS, increase power to 40 percent to maintain 180 KIAS. Once the underrun has occurred, as called by Wing, set power for 200 KIAS.

Wing - Give the student a chance to diagnose when an underrun is needed, but ensure they execute in a timely fashion. Most instructors treat the underrun procedure as a critical action item requiring memorization. Once underrun procedures are complete and flight path deconfliction is ensured, coach the students on arresting opening velocity and taking out the underrun inputs so that Wing does not create excessive separation. The goal of an underrun is to safely pass below and behind Lead when closure is out of control, not to get a half-mile of separation.

The correction for being extremely long on bearing during a VMC turn away is beyond the scope of primary form training. If a student ends up excessively wide after an underrun, the IP should reset the aircraft to the proper VMC turn away position, and debrief them on how to execute a better underrun.

e. "Back in" - Requesting "back in" is accomplished by the instructor and is a time / gas saving technique for setting up another rendezvous. This is usually done after an underrun or when a student needs another look at the rendezvous. Of note, also ensure students are given the opportunity to join to the outside because this is what they will do on their solo if they underrun.

A useful technique for moving back in (meaning back to the inside of the turn) is simply doing a rendezvous in reverse. Wing will pass below and behind Lead, maneuver to the inside of the turn with aileron input, and create opening velocity on bearing line using the PCL to slow the aircraft.

When an underrun creates excessive aircraft separation, another technique which may be useful is for Wing to request Lead to reset power (if reduced for a forced underrun) and slowly reverse turn. This will place Wing in a position to execute another join (from the opposite side) and save the excess time and fuel required to reposition the aircraft. Wing may be acute initially and need to maneuver to reposition on the 60 degree bearing line.

8. Lead Change. New Wing IP - Teach SNA to be patient and not pass the Lead until the Wingman is in good position, particularly not sucked. Most students will tend to "lean" the aircraft toward the new Lead while they are looking over their shoulder or during the execution of the lead change.

New Lead IP - Watch new Wing student's helmet to ensure they are looking at your aircraft. Be prepared to call them out over the tactical frequency if they look away.

a. Admin lead changes - Most efficient way to reset for additional lead change training and is normally reserved for Instructor use only. Example: new Wing student does something unsafe and IP desires to give them another attempt or demo a technique. To initiate:

Wing - On tac. freq.: "(Tactical Callsign) request the lead on the (Left / Right)"

Lead - On tac. Freq.: "You have the lead on the (Left / Right)"

b. Housekeeping (TCAS and Transponder) - Most students have not given this much thought. It is worthwhile to give them a technique for systematically turning off the TCAS and Transponder while trying to fly form.

c. This is an excellent place to discuss mission crosscheck time (MCT) with your student. Wing may only be able to look away from Lead for enough time to input one or two key presses and then go back to scanning Lead. The instructor can also explain that in parade, your MCT will be considerably less than when in cruise position.

9. Cruise Position / Maneuvering / Tail Chase. A good time to demonstrate cruise maneuvering and tail-chase is at the end of F4102-F4202 flights if fuel and time allows and the students are up to MIF. This gives an opportunity to demonstrate the basics of lead and lag pursuit and maintains IP proficiency. Both shall be thoroughly briefed before the flight per the current FTI.

A common technique is for Lead to perform a level 180 turn to allow Wing to demonstrate lead, lag, and pure pursuit curves. A Wingover or Loop provides a good maneuver to translate the same concepts to three dimensions. Cruise Maneuvering and Tail Chase should not be confused for Basic Fighter Maneuvers (BFM) or Air Combat Maneuvering (ACM). Excessive G loading and extended maneuvering could result in the SNA becoming airsick and prove counterproductive to the intended training. The Section Leader should brief how the join-up is to be executed when maneuvering is complete.

10. Recovery.

a. Uncontrolled Field or Tower Directed Entry (Unable to execute overhead break): Execute a normal VFR recovery in accordance with the FAR/AIM or FWOP procedures, but realize additional time will be necessary for configuration and spacing. A straight in approach may be the most difficult to gain the necessary separation.

b. PEL: Both students will need to be graded on the PEL. Therefore the flight will need to be broken up into singles prior to high key. The following are examples of how to execute a PEL entry as a flight:

Lead: Give student a simulated emergency 5 to 10 miles from the field. Student executes critical action items, informs Wingman of situation, and Wingman moves to chase position. Lead then proceeds to high key per contact procedures.

Wing: Once chase training is completed, request to detach, execute a 360 degree turn away from Lead generally at or just prior to High Key. Turn TCAS and Transponder back on, if secured. Once inbound, give student a simulated emergency. Proceed to High Key per contact procedures.

Alternate Technique: Lead IP utilizes a simulated cloud deck to accelerate to high key while Wing IP allows SNA to climb for DEGA. With this technique special emphasis must be paid to maintaining separation utilizing TCAS and/or comms. Weather may preclude the use of this technique.

11. Post Landing Pattern Rendezvous. Once the SNAs have completed their pattern work and depart from the OLF, the IPs may take controls and fly the join-up until maneuvering can be accomplished utilizing FTI procedures, at which point SNAs can take controls and complete the join up per FTI. This should be thoroughly covered during the brief, emphasizing that Wing maintain at least 500 ft below Lead until "visual." Two possible options are provided below:

Option 1: Lead and Wing depart and conduct a normal Running Rendezvous. Because the interval between airplanes is much greater the delay in join-up is much greater. Any angle Lead can provide Wing will assist in expediting the join.

Option 2: Conduct a blind style rendezvous utilizing a radial/DME, TSD (center of block), or ground check point.

12. Section Takeoff & Approach. IPs may demo a section takeoff and approach at the end of the first leg of an out/in in order to maintain proficiency if time and fuel permit. One possible profile is to do a PPEL into BFM followed by touch and goes then full-stop, taxi back for a section takeoff followed by a section approach into KJKA or K1R8. Given the limited opportunities to practice section approaches IPs

should thoroughly brief the approach before take-off with a robust ORM discussion.

Gear should be dropped prior to the FAF with plenty of time to get all of the signals done and not interfere with the approach. This can be done as early as 10 miles out.

WARNING: IP's MUST be cognizant of airspeed throughout the section approach. One technique is for Lead to keep speed approximately 5-10 KIAS higher than the desired speed for Wing. It is critical that Wing keeps airspeed in their scan while flying the approach.

Course Rules Recovery: ATIS is most commonly obtained by Wing enroute to course rules.

While still in the working area, a common technique is for Lead to conduct **CFA** (Wing to **Cruise** position, **Fence** the flight out, and then direct Wing to get **ATIS**). Wing IP may demonstrate lead and lag pursuit while in the cruise position. Of note, course rules entry and recovery may be a challenging phase of flight due to the restricted maneuverability of a formation flight. Early and conservative deviations for traffic is often the best course of action.

13. Break (3 second break). Emphasize the importance of gaining separation as Wing. Also, it is extremely important to emphasize to the SNA to always keep Lead in sight. Use configuration and track over the ground as necessary to maintain appropriate separation from Lead. Brief SNAs to be prepared to request south field penetration when they contact tower at the VFR entry point if landing on runway 14 or 23. Expect and guard against the following student errors:

a. Lead will overbank and be tight on downwind.

b. Wing will lose sight of Lead in the break and try to cut inside of Lead.

c. Lead will fly a wide downwind while Wing flies a normal downwind causing a conflict at the 180.

d. Lead will reduce power prior to initiating break ("Chop, Flop" as opposed to "Flop, Chop") creating rapid closure by Wing.

14. Wave-off. If Lead encounters a situation where the flight should wave off they may announce "Tactical Callsign, Wave-off" over the radio in use. If Lead is performing a wave-off for reasons that would not affect Wing, no call is necessary.

CHAPTER NINE

DEFENSIVE POSITIONING TECHNIQUES

900. Overview. The following is a list of some basic physical defensive positions to keep you safe and the aircraft within the specified NATOPS limits. Additional defensive positioning techniques can be found in chapter two of the Out-Of-Control (OCF) Flight Training Instruction (FTI). Not included are all the possible CRM converstations you need to have with your student in order to prevent a "situation" from occuring. Clear, concise communication with an understanding of what is to be accomplished will help to mitigate unsafe situations. Inevitably, students will still make mistakes. Your challenge is to constantly weigh how far you are willing to allow the mistake or pending mistake to progress. An instructor who always takes the controls can have a negative effect on training. On the other hand, you should never let a mistake progress to the point of endangering the aircraft or aircrew, or other aircraft in the area. Allowing the student to self-correct a mistake enforces learning and is ideal. Always search for that balance. Only you can decide what your limits are. As your experience and knowledge grows, you will find that your safety boundaries and comfort level will expand with certain maneuvers and possibly even shrink with others.

Mental preparation is as important if not more so than the physical blocks; Defensive Driving if you will. **Never start a maneuver or procedure without identifying your limits. Have an exit plan when the maneuver or procedure doesn't go as scripted or the student doesn't take the actions you expected.** Taking the controls is the quickest way to make the aircraft do what you want it to do. Do not hesitate to take the controls. The damaged pride and hurt feelings of your student are easier to fix than a broken plane or loss of a crew.

Habit patterns can also prove to be an extremely valuable defensive asset to the instructor pilot. Checklists are an example of a formalized habit pattern and their need is evident. Informal habits can also prove invaluable. A very popular example of an informal habit is to leave the "Probes Anti-ice" switch off until takeoff clearance has been received. This simple habit will ensure you do not takeoff without clearance. Healthy habit patterns can provide the needed "muscle memory" when you most need it, such as when you are fatigued or otherwise distracted. And, if you find yourself operating outside your normal habit patterns, be on your guard - that's when the risk is greatest.

Lastly, know your procedures! All the positioning, preparation, and habit patterns possible will not prevent all mistakes. It is required for you to be prepared to handle whatever situation presents itself.

901. General.

1. Riding the Controls.

Problem: SNAs will often misinterpret IP control inputs as the IP assuming control of the plane or will fight the IP on the controls if the IP input is not recognized. Also, students may not be aware of IP inputs and consequently have an unrealistic understanding of their own skills.

Defensive Techniques:

a. Brief thoroughly and communicate verbally in flight. Be sure the SNA understands that you will apply yourself on the controls as needed, and that unless you state "I have the controls" the SNA is still flying. Talk through your inputs. If you do make corrections or subtle hints via the controls, be sure to inform the student and inform them as to why the correction needs to be made. If verbal communication is not clear and the student appears to be silently deferring to the IP inputs, you may need to remind the SNA that "you're still flying," or "you have the controls."

b. Shake to take. At times it may be impossible to vocalize to the SNA that you need to take the controls. In such circumstances a good technique is to "shake to take" and explain later. Be sure to pre-brief such a technique during preflight.

c. Ultimately, the less inputs an IP makes, the better. A smart IP intervenes only when necessary and in such a manner as to always make it obvious, either through action or word. Usually, a so-so landing made by the SNA will teach him more than a perfect landing made mostly by the IP.

2. Over-speeds.

Problem: SNA attempts to lower the gear or flaps when aircraft speed is in excess of 150 KIAS or leaves the gear and flaps extended during acceleration. Another common place to experience an over-speed is during set-up for the ELP, most frequently during a slip.

Defensive Technique: IPs must anticipate circumstances when the SNA might attempt to lower the landing gear and guard the Gear Handle to ensure airspeed is checked first. This is not limited to the low work and often over-speeds occur at altitude. Follow along with the SNA's profile and if the next event is an ELP stall series, begin guarding the gear handle as the student begins preparation for the ELP stall. Finally, a good technique is to teach your student to clean up the aircraft prior to communicating with either the instructor (or RDO when at an outlying field) and verbalize the aircraft is clean, "gear and flaps up at 125." It is also prudent to minimize your debrief until the aircraft is clean.

a. **Physically block the gear handle in the break** by placing hand firmly under the handle. Have student verbalize "below 150 knots" with a downward trend in airspeed. You cannot physically guard the gear and flaps simultaneously. Choose to guard the gear but be aware students have selected flaps first while in the break. If you feel downward pressure on the gear handle, verbally correct the SNA or take controls and sort it out once situation has been diffused.

b. **To prevent over-speed on acceleration**, identify your own comfort airspeed limit (ie, no greater than 140 KIAS) that allows you to verbally correct the student. After your limit has been exceeded, the aircraft is yours. Bring PCL towards idle. If positive G's are required (i.e., rapid climb) to arrest an increase of airspeed, consider NATOPS symmetric and asymmetric G limits for gear and/or flaps down. More importantly, you should know if traffic is above you before pulling back on the stick in the pattern.

c. **To minimize the likelihood of an over-speed during setup for ELP**, emphasize to the student they should strive to maintain the 120 KIAS or 125 KIAS during a slip. Guard against abrupt control or reverse inputs. Hands and feet should be in close proximity of the rudders and stick. If time permits, use clear concise communication allowing the student to correct on their own. If incorrect inputs or slow recovery is observed, take the controls, bring the PCL toward idle, and make the corrections.

If you exceed the gear / flap limits, coordinate a random recovery with ATC. Advise them you are speed restricted and request a straight in or PPEL at NSE. Avoid Course Rules.

3. Blown tires.

Problem: Blown tires on the Main Landing Gear.

Defensive Technique: Blown tires are unfortunately fairly common in the T-6B. The braking system is very effective but provides minimal feedback to the pilot to determine how much pressure is being applied. To compound this problem, the tires on the aircraft are not extremely durable.

Often blown tires are caused by a student or instructor attempting to make an early turn off the runway during a full stop landing. Another situation resulting in blown tires is in an effort to clear the active runway due to landing traffic or a perceived sense of urgency possibly caused by a controller asking the instructor to "expedite." In both situations, it is more prudent to simply roll to the end. A call of "unable" to a tower controller may be frustrating for the controller, but he'd be much more frustrated if you FOD the runway with a blown tire. Regardless of the controller, you alone are responsible for the safe operation of your aircraft.

If maximum braking is necessary, a good technique is to take the controls from the student as opposed to supplementing their brake

inputs. This allows the instructor to properly gauge how much braking pressure is actually being applied.

Instructor foot positioning on the rudder pedals is a matter of personal preference, but one technique is for the IP to fly with his heels at the base of the rudder pedals and toes resting on the tops of the rudder pedals. This gives feedback to the instructor as to when/if the SNA is applying the brakes. Common places for SNAs to inadvertantly apply the brakes is during the take-off roll or during right rudder application during the touch and go. SNAs have also landed with brakes applied. It is impossible to physically block an SNAs brake application, but this technique may allow the IP to verbally correct the student.

Finally, foot position on the rudder pedals should be discussed in depth with a new student to prevent inadvertant application.

4. Note taking.

Problem: When do I take notes?

Defensive Technique: When safety of flight is not in question. Common practices are to take notes at pattern altitude and estabished on downwind in the landing pattern. At altitude, a technique is not to take notes when the aircraft is configured. Once clean, the hazard of gear/flap over speed or departing controlled flight with the gear or flaps extended is eliminated. Finally, the amount of writing can be minimized if the instructor develops a shorthand technique or writes down trends for the student as opposed to detailed notes on every maneuver.

902. **Ground Ops**.

1. Cockpit Familiarity

Problem: You are flying with the Student for the first time in an early contact block. During the flight you experience uncommanded prop feather, uncommanded power change, engine fire or emergency landing gear extension and the student doesn't know where any of the required switches are located.

Defensive Technique: In the C4100 block, after student straps in, have them point out the Prop Sys Circuit Breaker, PMU Switch, Firewall Shutoff Handle, Emergency Landing Gear Handle, and TCAS circuit breaker. Additionally, explain to the SNA the importance of knowing the locations as they will be the only one who can reach them in flight.

2. Parking Brake Awareness.

Problem: Student does not set the parking brake properly resulting in unintentional movement after engine start or attempts to taxi with the parking brake set.

Defensive Technique: Before the canopy comes down as you're saying "rail clear, box closed," push hard on the brakes to make sure they are set. Continue to guard brakes, especially when the student is consumed with the checklist and other aircraft are taxiing in close proximity. Remain vigilant after chock removal and be prepared to apply brakes. Another technique is to have your student verbalize over ICS anytime the parking brake is set or released.

3. Seat Strap In.

Problem: Student does not put on his shoulder straps.

Defensive Technique: Enforce the procedure of leaning forward until full extension of the inertia reel straps and then sitting back. A good technique is to also teach the SNA to rock in their seat to feel the lowers are tight and visually checking the legs are in place while verbalizing "Uppers, lowers, legs - complete." After the canopy is down, look in the canopy mirrors for the student's shoulder straps (from the front cockpit) or look for the SEAWARS resting on their shoulders (from the rear cockpit). Hold the checklist until their uppers are connected. If they missed their uppers, have the student visually re-verify uppers, lowers, legs, and CRU-60.

4. Proper Engine Starts.

Problem: Student attempts start without START RDY Light.

Defensive Technique: Students will typically count the required 3 seconds, then look away and call "prop area clear" followed by selecting AUTO/RESET. Force them to verify the start ready light a second time before selecting AUTO /RESET. Place your hand over the PCL to verify it is not moved during the start sequence. Verbally direct them to abort the Start over ICS if loss of START RDY is experienced but be prepared to do it yourself.

a. With PCL close to off or actually in the off position, anticipate having to use AUTO/RESET to secure start.

b. Anticipate the student will freeze or forget about using the AUTO/RESET to secure the start.

5. PCL Movements.

Problem: Student inadvertently moves PCL off when N1 reaches 60%.

Defensive Technique: Firmly place hand behind PCL to prevent PCL from being retarded. Once 60 percent N1 has been reached, immediately push PCL forward 2 clicks if you sense student is attempting to retard PCL or is delaying the advancement. **Do not** direct the student to attempt correction. If your guard fails and the student retards the PCL towards idle, firmly grasp the PCL while continuing to pull to the off position and maintain control of the PCL. Anticipate the student

realizing their mistake and trying to advance the PCL back to idle, thereby reintroducing fuel and causing an engine over-temp from residual heat.

6. Proper Hand Positioning During Taxi.

Problem: Student taxis in line area with left arm on canopy rail (Hand not on PCL).

Defensive Technique: When in the line area or close proximity to ground objects, left hand should be on the PCL always ready to secure the engine. Direct student to guard the PCL when in the line area or in close proximity to ground objects while taxiing. This forms good habit patterns for when the student is on solo flights.

7. Main Gear/Door Location.

Problem: Student taxis with main gear door in close proximity to taxi edge lights.

Defensive Technique: Point out the wing hoist point on the left and right wing (looks like a black question mark along the leading edge, about ¼ wingtip distance). The hoist point can be used to identify approximately where the main wheel is located. The main gear door actually sticks out a little further. Consider not allowing the student to taxi any closer to the edge than the inboard portion of the star on the left wing, and the most inboard number on the right wing. Depending on the taxi speed, be prepared to immediately take controls and turn away or even stop the aircraft. Consider using power and differential braking for smaller radius turns.

8. Seat Safety Pin.

Problem: Student doesn't remove and stow or install seat safety pin correctly.

Defensive Technique: In addition to the verbal response, always visually confirm the canopy handle for both seat safety pins. Additionally, visually ensure your student is using two hands to remove and stow the pin. Interruptions to a student's normal flow such as "Taxi back checklist" on an abort takeoff demo can cause habit patterns to drive their actions vice the checklist.

9. Nose Wheel Centered Prior To Takeoff.

Problem: Student fails to center nose wheel prior to takeoff resulting in aircraft control problems and potential runway departure.

Defensive Technique: Ensure the nose wheel is centered and aircraft is stopped prior to disengaging nose wheel steering. Additionally, releasing the brakes with the power set at 30 percent and smoothly advancing PCL to max in two to three seconds (as opposed to releasing

brakes with max power set or slamming power to max after brakes are released) should minimize yaw due to torque and allow the instructor time to correct should the nose wheel not be fully centered.

903. Contact Events.

1. Low Altitude Awareness.

Problem: Student over controls while flying at low altitudes resulting in Stall, OCF, over-speed, over G, tail strike, blown tire, departing the runway, etc.

Defensive Technique: Anytime you are below 800 feet there is very little time to react. Pre-position your hands and feet to guard against large control movements or be ready to immediately take the controls. This includes take-off.

2. Rotation on Takeoff.

Problem: Student tries to rotate early or over rotates.

Defensive Technique: An early rotation coupled with dropping the wing on rotation will increase stall speed and is a set up for a stall with little or no altitude to recover. Once you have committed to rotating, guard the PCL from being retarded. Guard the stick from being abruptly pulled back or lowered. Emphasize keeping the wings level and holding the takeoff attitude. A wing drop on rotation is most often caused by the SNA not using enough right rudder input. Be especially cautious on the first takeoff of the day - at 6,500 lbs, rotate speed is actually 90 KIAS as opposed to the 85 KIAS training standard.

3. Out of Controlled Flight (OCF).

Problem: Student tries to spin with the PCL out of IDLE, gear and/or flaps down.

Defensive Technique: Start by having the student brief the spin both on the ground and prior to the maneuver. There should be no surprise with intentional OCF. For example, "This will be a spin to the right. Please cancel the gear horn when I acknowledge the warning. I'll enter the spin with full right rudder and full aft stick. I'll call altitude, AOA, airspeed and turn needle. I will initiate my own recovery using inadvertent departure from controlled flight (or anti-spin procedures)."

Guard PCL from being advanced. Guard stick and rudder to ensure proper pro-spin inputs and ensure full control deflection. Should deviation occur from the brief, terminate the spin by taking controls and recovering. Ideally, all confusion will be cleared up prior to intentional OCF, but if there is confusion, clear it up after the OCF, not during.

Problem: SNAs will struggle with adequately inputting pro-spin controls, expeditiously reading out their indications in the correct order and with initiating their own recoveries.

Defensive Technique: Brief on the ground and in flight prior to the maneuver. Be sure your expectations for the maneuver are clear. This is especially critical when spinning with a student for the first time, such as during an off-wing contact. Ensure the student knows what neutral control inputs look like. Also, ensure the rudder positioning does not allow the SNA to lock his knee. Ensure the student initiates his/her own recovery. Avoid training your student to wait for their instructor's command to recover. This establishes a very dangerous precedent for a pre-solo student! On the other hand, if the SNA is slow in their recovery execution, verbally direct them to recover. If ever there is a time to be vigilant monitoring the SNA's control inputs, it is during the spin.

4. Proper Break Interval.

Problem: Student tries to break into someone on downwind (Cutting off interval).

Defensive Technique: Listen to traffic calls to assist in locating other aircraft and identifying interval aircraft. Your student is most likely overly focused on the next radio call. You can also use the FMS NAV page with a 5 mile scale to assist in checking for traffic. Anytime you see a conflict, guard the stick on the side of downwind.

5. Discontinued Entries.

Problem: Student or RDO not recognizing need to discontinue.

Defensive Technique: Listen and Look. RDOs are susceptible to lapses of situational awareness just as much as you or your student. An OLF with five aircraft in the pattern and one aircraft at high key is a difficult pattern to manage.

An aircraft inside of High Key and you inside of initial could result from radio transmissions being blocked. Monitor the OLF VHF frequency to improve situational awareness. Additionally, your altitude may provide better reception from inbound aircraft and you can help relay comms to the RDO in this situation, workload permitting. Beware of late calls from ELP traffic. A late call can be just as dangerous as not calling. The FWOP is very clear about when initial traffic should discontinue and it is determined by the location of the ELP aircraft. If the ELP aircraft calls late, you may be allowed to enter the pattern when you should be executing a discontinued entry. Always look for Low Key traffic as you approach the initial.

Finally, if the SNA fails to select the OLF frequency and remains on the area common frequency, you should decide how long you allow your

student to remain on the wrong UHF frequency. If you decide not to correct them, you should discontinue the entry no later than 2 NM, as you are unable to properly clear the OLF and high key traffic.

6. Landing Pattern Positioning.

Problem: Student gets slow off the 180 through the final turn resulting in a low altitude stall or OCF.

Defensive Technique: Hands off the canopy rails. Note taking stops. Hands should guard the stick for excessive angle of bank and abrupt back stick movement. Feet should guard the rudders for abrupt rudder inputs or inside rudder deflection. Left hand should guard the PCL for abrupt inputs or for the need to wave-off by smoothly adding the appropriate amount of power. Closely monitoring the controls also provides the added benefit of determining the SNA's power and control inputs and allows for accurate instructional feedback. Emphasize CTS of 0 knots slow and do not allow the student to exceed it. The no flap approach is the most dangerous because it has the highest stall speed. The skidded turn stall is possible, violent and fast. Couple a slow airspeed with a little inside rudder around the 90 and you will have little to no time for recovery. Ejection will most likely be your only option.

Start the recovery process for being slow with clear, concise communication if time permits. Saying "you're slow" or "airspeed" may not evoke the desired or correct inputs. Tell them exactly what you want ("add power," "add a little more power and lower the nose slightly"). If time does not permit or the student response is slow, then you must immediately take controls.

7. Over Rotation on Touch & Go's.

Problem: Student over rotates during touch and go with possible tail strike.

Defensive Technique: Set right hand on back of stick and scan gyro/ horizon to catch when student is attempting to excessively raise the nose up. Limit any further back stick pressure once nose attitude exceeds 10 deg up and then debrief for future passes.

8. High Flare or "Ballooning".

Problem: Student flares too soon resulting in float and subsequent hard landing or over rotates resulting in a "balloon" above the runway.

Defensive Technique: If caught early, tell student to wave off. If time does not permit or student does not respond immediately to your wave off command, take controls and execute a wave off. Maintain the aircraft in a nose high landing attitude until a positive rate of climb is established. If the student is going around, they may not

add any right rudder. Guard against a rudder swap due to late rudder application or over/under compensation of rudder. Use Ailerons to maintain wings level thereby keeping your stall speed as low as possible.

9. Centerline Control.

Problem: Student lands off centerline or drifts off while on the deck due to poor understanding of crosswind procedures, not looking outside.

Defensive Technique: Only give the student half the runway to land on (the middle half). If Student lines up outside of that, give student verbal prompting, to move toward the centerline. Guard rudder and ailerons against abrupt or incorrect inputs. Hand should be on PCL, ready to execute wave off. Have student verbalize, "left wing down, top rudder" to help ensure understanding of the correct inputs required. If there is no response and student tries to land outside of your limits or is unable to make the appropriate adjustments based on your verbal guidance, then either tell the student to wave off or take the aircraft and execute a wave off.

904. AEROBATICS.

1. Over the Top Stalls.

Problem: Student gets slow resulting in possible inverted stall at the top of an over-the-top maneuver (Loop, Immelmann, Cuban 8 or Clover leaf).

Defensive Technique: Be very aware when the student starts an over the top maneuver. If starting the maneuver slow and with less than MAX power and they do not pull 3-4 Gs on the initial pull-up, then have them terminate the maneuver / recover. However, as a final defense to avoid an inverted stall, avoid the nose being straight-up with less than 180 knots. Anytime you reach 180 knots before you reach 90 degrees pitch, immediately command the student to recover from nose high unusual attitude. If the student does not respond or is slow to respond, take the controls and recover the aircraft using the appropriate procedures. If airspeed is allowed to decay excessively, OCF recovery procedures may be necessary.

2. Airspeed Awareness.

Problem: Student does not pull hard enough while inverted or starts the Split-S at too high of an airspeed and you see greater than 160 knots pointed straight down. (Split-S, Clover leaf, Cuban 8, or Loop).

Defensive Technique: With the Split-S, patience is required when inverted due to the PCL at idle. Allowing gravity to start the nose drop with light positive G loading is key. Conversely, with max power maneuvers such as the Loop, the student must reach the 4 G pull sooner

compared to the Split-S maneuver. Students may be well within the 100-120 knots airspeed over the top and not pull as hard as they should and end up pointing straight down at a very high airspeed. As a rule of thumb, 160 knots or less is what you are looking for pointed straight down. If airspeed becomes excessive, have the student recover using nose low procedures. If the student hesitates, or there is confusion in the cockpit, take the controls and execute the recovery. Guard against a sudden spike of back stick pressure as it may cause an over G or accelerated stall.

905. Instrument Navigation.

Problem: Errors while flying in IFR / IMC conditions resulting in Spatial Disorientation, Loss of SA, Controlled Flight Into Terrain (CFIT), or flight violation.

Defensive Technique: In IFR environments, you cannot let the student deviate as far from CTS or ATC assigned instructions as you can in VFR. It is not necessarily ideal training, but you need to correct the student on the spot and possibly switch to a directive mode of instructing (i.e. tell the student what to do and when) regardless of where the student is in the syllabus. If you do not do this, the student is likely to get spatially disoriented, get you spatially disoriented, and suck up all of your situational awareness (the negative co-pilot theory). If this happens, it is time to take the aircraft and get yourself reoriented. Alternatively, if you have determined that the student is degrading your SA with poor procedural compliance or basic airwork and weather allows, consider cancelling IFR and proceeding VFR. This will mitigate ATC violations and allow the student the opportunity to fix mistakes.
*If you feel there was a safety issue that others can learn from, utilize the Navy's ASAP report and/or the NASA aviation safety reporting system at http://asrs.arc.nasa.gov/

906. Formation.

Formation is a unique combination of flying and instructing. Because of the close proximity of two aircraft, it is understood that the IP must always closely guard the controls – not just because of his student, but also because the other student is 20 feet away! There is a fine balance between flying the plane and hovering around the controls. Ideally, your student will not feel you on the controls, but you are ready to take the controls at any moment. This balance will depend upon student's ability, your own experience and comfort level, and the maneuver. Never allow the student to exceed your own limitations with aircraft proximity. If the student's skills are so poor that you need to be on the controls and flying the profile, do it and grade accordingly.

1. Over Controlling.

Problem: Improper control inputs and corrections in parade (Wing).

Defensive Technique: Expect the unexpected, not just from your student, but also from Lead. Never allow wingtips to overlap or the aircraft to be stepped up, especially simultaneously. If you are sucked, time may allow for a verbal correction. Otherwise, initiate corrections by taking controls and maneuvering the aircraft to a safe position.

2. Lead Change.

Problem: Poor transfer of lead (Lead or Wing).

Defensive Technique: Expect the worst-case scenario from both students staring at each other, thereby leading to both aircraft driving in towards each other. Because of the natural tendency to fly where we are looking, there may be anywhere from a subtle to rapid closure rate between the two aircraft. Brief the students to resist this tendency and to be aware of it. As the new Lead, you should divide your attention towards ensuring your student is looking forward while also being prepared to maneuver away from the new Wing if necessary.

As the new Wing, if you sense a closure rate, you may be able to offer a verbal correction. However, if the closure rate is too great, immediately take the controls and correct. Request to reset the maneuver if necessary. If new Lead IP notices the new Wing not looking at new Lead, notify the other IP immediately on Tac freq.

3. Breakup and Rendezvous.

Problem: Improper break and corrections during rendezvous.

Defensive Technique: Always be prepared for Lead to break into Wing and set a block with your hand. As Wing, once set on the 60° bearing line, you should be on guard anticipating the student correcting for high closure rates by overbanking away. Overbanking away will cause you to go blind and acute and will result in greater lead pursuit, possibly increasing the closure rate between aircraft. Depending on your distance and closure rate, time may allow for verbal corrections, otherwise, immediately take the controls and execute underrun procedures if necessary.

CHAPTER TEN

SIMULATING EMERGENCIES IN THE T-6B

1000. Emergency Procedure Training Basics.

1. Overview. The basic EP training SNAs receive in Primary will form the foundation for their confidence in safely dealing with emergencies as they move forward into more advanced airframes with more complicated emergencies and procedures.

2. Common SNA Errors and Tendencies. Students have a difficult time managing tasks when faced with the pressure and time critical nature of simulated emergencies. BAW often degrades significantly and situational awareness may reduce to an absolute minimum.

3. Instructional Tips. See CH 6 Contacts for guidance tailored to specific blocks of training.

a. Generally, EP training will commence during the C4200 block of training and intensify throughout the later stages of contacts until completion of C4790.

b. Little EP training is conducted or expected during the instrument stage, but this should not preclude IPs from introducing simulated emergencies when they deem training value may be added. This is often a good way to evaluate an SNA's situational awareness as to the proximity of the nearest suitable divert.

c. Not just Lip Service. Ensure SNAs are not simply reciting procedures without actually executing the steps..

d. Aviate, Navigate. Stress the importance of maintaining aircraft control first and foremost. If the aircraft is not flying safely, then an SNA is merely compounding the gravity of the situation. When required, turning towards the nearest suitable divert is a critical component of aircraft control. Executing memory items is of little use if droning aimlessly away from a safe airfield, possibly making DEGA unobtainable once the engine fails.

e. Assess the Situation. With the plane flying safely have the SNA read out the indications if not a part of the initial EP introduction. What to do with the PCL (Off, Max, Mid-Range, Minimum Necessary, Slowly Retard) is a critical step to execute correctly, so teach them to slow down, analyze and execute the appropriate steps in a smooth and methodical manner. Also, it is better training to give the SNA the indications and allow them to determine the malfunction than to give them the answer (i.e., "you have loud bangs coming from the engine and you see smoke and/or flames coming from the stacks" as opposed to "you have a compressor stall"). Show them where the indications may be found in NATOPS. Often students will study the gouge or the Pocket Checklist and miss this important aspect of Emergency Procedure training.

f. Land. Once the SNA has sufficiently dealt with the procedures required of the simulated EP, attention should be turned to bringing the scenario to its conclusion.

g. Simulated Emergencies should initially be rather basic and introduced in a non-time critical environment in order to allow students to focus on learning how to execute the EP. Allow SNAs ample time and space to work through procedures in order to focus on maintaining aircraft control. Intensity of training may always be increased as the student progresses.

h. All simulated emergencies should be prefaced with the words "simulated, simulated, simulated" so as to leave no doubt in the SNA's mind that whatever follows is for training purposes only and is not actual.

i. IPs must be defensively positioned on the controls, but especially the PCL, during all simulated emergency training. SNAs' first reactions to emergency scenarios are often incorrect, and it is incumbent on the IP to ensure this does not place the aircraft in harm's way. Additionally, SNAs may have just finished a simulator phase of training where all procedures are actually executed, i.e. PCL-Off. This simulator muscle memory may make for a bad day if not guarded against.

j. Prior to simulating emergencies, but specifically power loss scenarios, consider placing the aircraft at or above DEGA to a suitable field. This is especially true when introducing power losses during a PEL/P when sufficient altitude for an airstart is not available.

k. Managing energy during a simulated power loss is one of the greatest challenges SNAs will face during EP training. The fluid and variable nature of these scenarios make them challenging for SNAs and require in flight calculations that prove difficult while attempting to maintain BAW. Spending time on the deck going over practice DEGA calculations will payoff in the plane. Pay special attention to altitude requirements for 180° turns to align for high key (ex: 180° of turn at 30° AOB = 1000 feet of altitude).

l. Following EPs to their logical conclusion is a critical component of training, especially during PELs. However, EPs can interfere with a SNA's ability to learn the flying required of the ELP profile. Therefore, do not hesitate to have SNAs fly PELs without an associated EP, especially when conducted as the second or third PEL of the event. The same is useful with PEL/Ps.

m. Emphasize PEL/Power Loss scenarios that require the SNA to zoom glide. The exchange of airspeed for altitude is a vital step in maintaining aircraft control but often gets lost when the SNA is struggling to deal with a simulated emergency.

n. Introduce PEL scenarios that require the SNA to accelerate into High Key. This maneuver is challenging to perform well. Further, students often forget the "or accelerate" verbiage in the PEL Critical Action items. Reference NATOPS for further information on airspeed/distance calculations and exchanges (ex: 60 KIAS = 1 NM).

o. Do not hesitate to introduce simulated EPs on the deck during ground ops. The exercise of stopping the plane safely before handling an EICAS light or other abnormal indication is critical in an SNA's solo preparation. A good technique is to teach students to use their emergency procedures or normal procedures (depending on the severity of the malfunction) to properly secure the engine and eventually egress the aircraft during a ground emergency. For example, if the Before Takeoff Checklist has been started, using either the Emergency Engine Shutdown on the Ground and Emergency Ground Egress procedures or the After Landing Checklist followed by the Engine Shutdown Checklist is a good way to safe the seats, shutdown the engine, and secure the rest of the aircraft systems in an orderly fashion.

1001. Emergency Procedure Setup.

1. When simulating emergencies, the following is an FTI compatible methodology:

IP: *"Simulated, Simulated, Simulated"* -> Reduce the PCL or state the simulated EICAS indication.

SNA:

1. **Maintains aircraft control** by turning toward the nearest suitable field and zoom gliding as appropriate, or otherwise ensuring the plane is flying safely.
2. **Assesses** the situation by reading off engine indications out loud to IP: *"Torque is ___, ITT is ___, N1 is ___..."*

IP:

1. Confirms Indications: *"I am reading the same", or*
2. Provides simulated indications: *"Simulated Torque, ITT, and N1 are all decreasing toward zero, Hyd pressure is slowly decreasing"*

SNA:

1. Diagnoses the malfunction: "That is a flameout"
2. **Takes appropriate action** by executing Memory Items
3. **Lands as conditions permits** in accordance with Memory Items and subsequent outcome.

2. Below are basic indications that may be introduced to an SNA when simulating emergency conditions.

1. *Simulated by PCL being reduced to IDLE*

- **Engine Flameout**-> Sim decreasing N1, Torque, and ITT; Propeller toward feather, Hyd and oil pressure gradually decreasing.
- **Eng Seizure**-> Sim torque, N1, Hyd and oil pressure suddenly come to zero.

2. *Simulated by PCL midrange or reduced short of IDLE*
- **Simulated Power Loss**-> Sim Low FF, Decrease N1, and High raw ITT
- **PMU Fail**-> Sim PMU FAIL warning Lt, step change in engine power
- **Prop Feather**-> Sim increased/high Torque, Np decreasing <40%
- **Oil/Engine/Fuel Contamination**-> Sim Power surge or Uncontrollable high power

3. *Simulated by smoothly oscillating PCL*
- **Compressor Stall** -> Sim fluctuating Torque, ITT, FF, Noise, Flames, Smoke

4. *EICAS Indications that may be Simulated*
- **Eng Fire**
- **Chip Light**
- **Low Oil Press**
- **Low Fuel Press**
- **Fuel Probe Failure**
- **Hydr Fluid Low**
- **EHYD Fluid Low**
- **OBOGS Fail**
- **OBOGS Temp**
- **GEN Fail**
- **GEN Bus Fail**
- **BAT Bus Fail**

5. Other Emergencies
- **Fuel Leaking** -> Sim FUEL BAL caution light, fuel leaking from wing
- **Bat and Gen Fail**-> Sim all MFD's and UFCP off
- **Avionic failure**-> Sim ADC FAIL or EDM FAIL warning light, IAC1 FAIL or IAC2 FAIL or IRS FAIL or UFCP 1 FAIL or UFCP 2 FAIL caution light, or any MFD fails
- **Smoke and fumes Elimination**-> State Smoke or Fumes in CP
- **Canopy Unlocked**-> Sim CANOPY warning light
- **Rapid Decompress**-> Sim CKPT ALT caution light
- **Cockpit Overpress**-> Sim CKPT PX warning light
- **Runaway Trim**-> Input trim and state "SIMULATED"

1002. Handling In-flight Emergencies. The information below is provided to SNAs as part of the Emergency Procedures Review during

ground training. It is intended to be used as a training aid in conjunction with NATOPS and the Contact Flight Training Instruction. It helps to illustrate the basics of handling an emergency and the step by step process necessary. It covers scenarios with engine malfunctions in flight as well as dealing with an emergency on the ground, but it **does not** cover every emergency in NATOPS.

How to handle an In-Flight Emergency

1. Maintain aircraft control:

- Maneuver into and/or maintain attitude that allows the pilot to respond to the emergency situation.
- **IF CURRENT ENGINE PERFORMANCE IS QUESTIONABLE** (can't maintain altitude and airspeed), make an immediate **TURN** towards the nearest suitable landing runway and transition to your best glide speed by initiating a **CLIMB** to decelerate towards 125 KIAS (or descent if already 125 KIAS or less). Get the aircraft **CLEAN,** gear and flaps up (if able).
- **IF FUTURE ENGINE PERORMANCE IS IN DOUBT**, make an immediate **TURN**, to the nearest suitable landing runway while using appropriate power to establish a **CLIMB** (if additional altitude is not required, set 4-6% torque and transition to best glide speed of 125 KIAS). Get the aircraft **CLEAN**, gear and flaps up.
- **IF ENGINGE PERFORMANCE IS NOT THE PROBLEM**, establish and maintain controlled flight in appropriate direction, airspeed, and configuration.

2. Analyze the situation and take proper action:

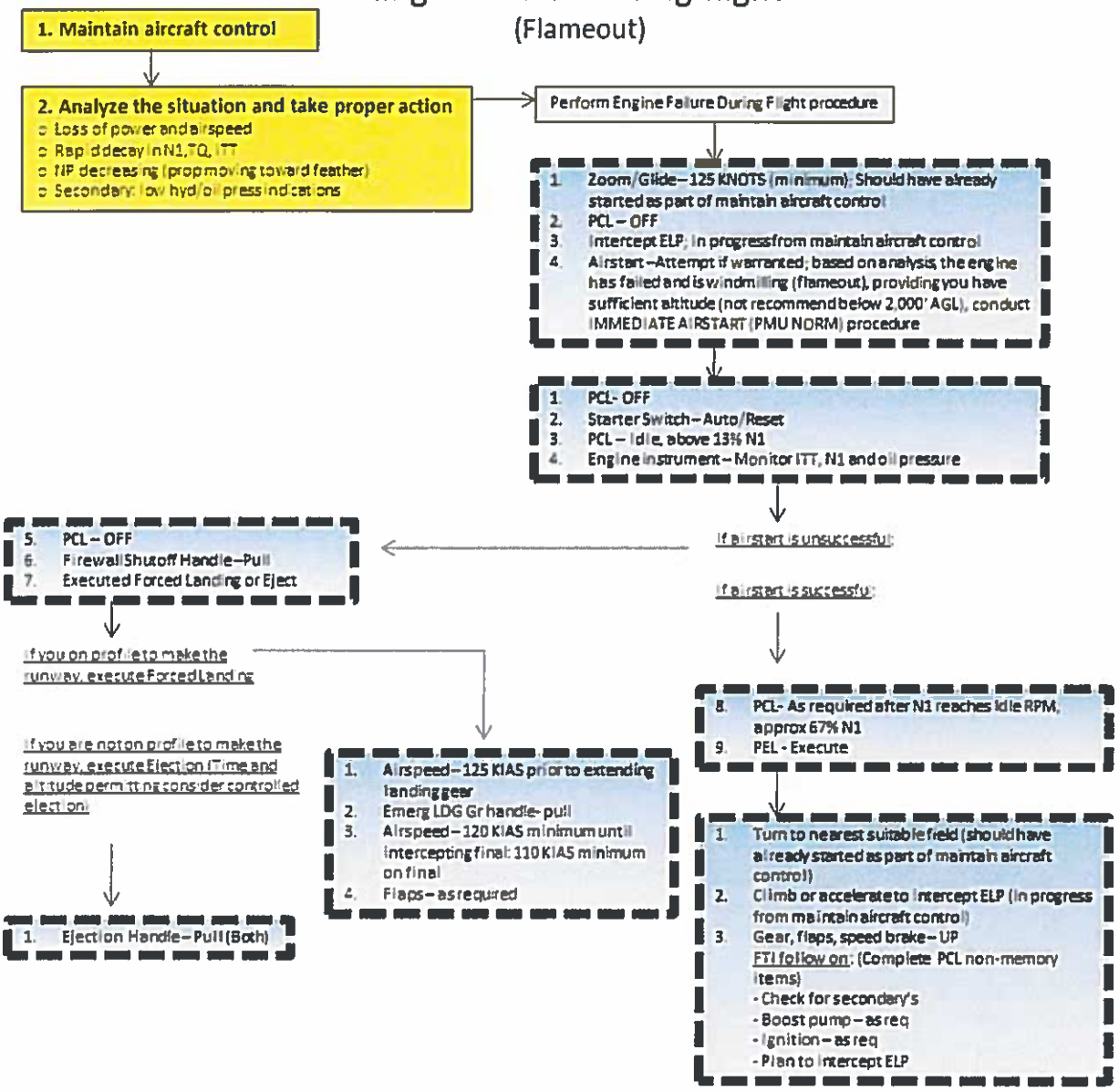
- Check and analyze indications
  - Aircraft performance
  - Warning and Indicator Lights and EICAS display
  - Other cockpit indications (visuals, noise, etc.)
- Determine the appropriate emergency procedure. You can't apply correct procedure if you don't know the problem!!!!
- Execute the appropriate emergency procedure (Begin at step 1)

3. Land as soon as conditions permit:

- Defined by the urgency of emergency or malfunction and sound judgement
- Usually will end in one the following:
  - PEL
  - Forced Landing
  - Ejection
  - Land as soon as possible
  - Land as soon as practical

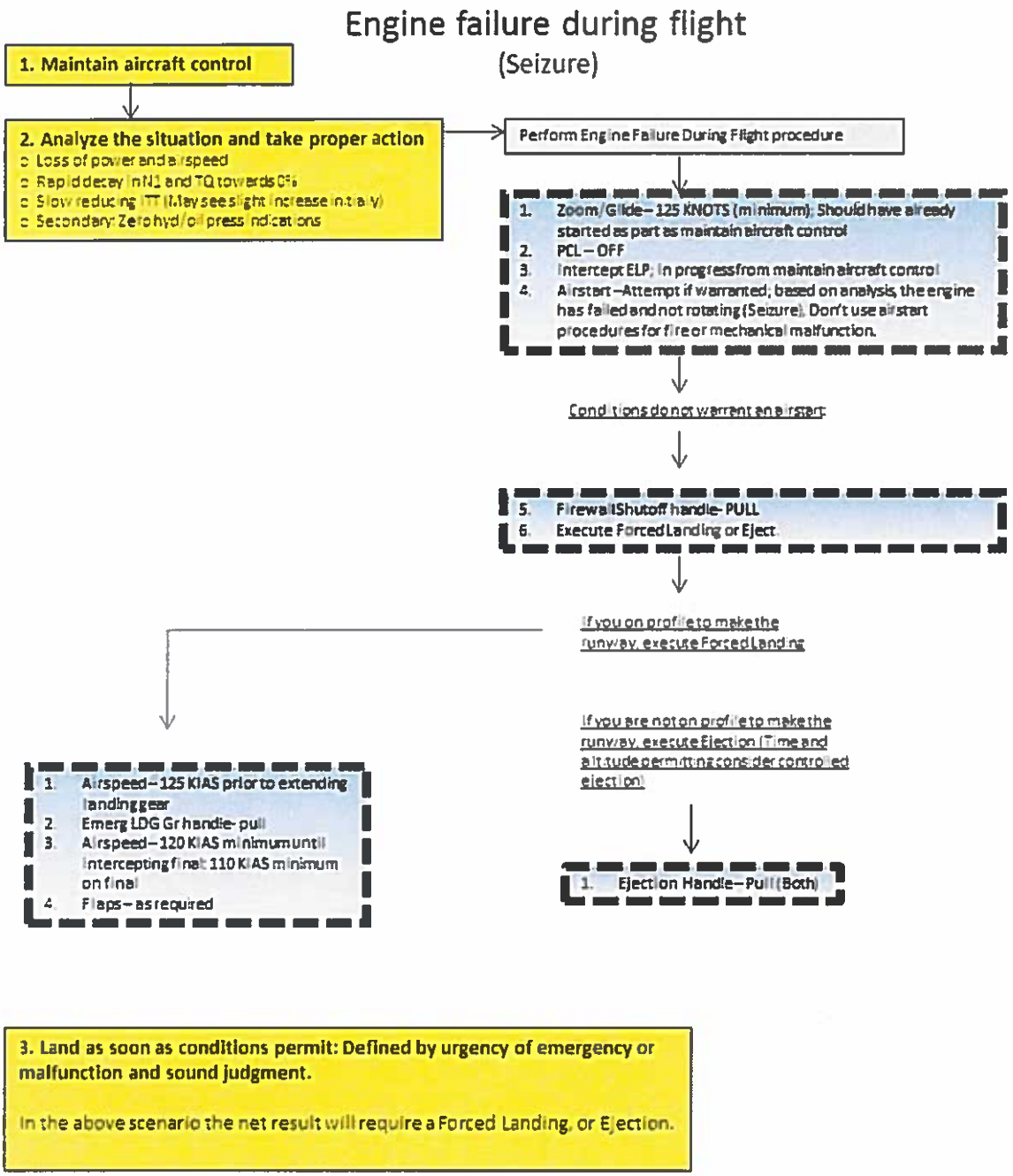
2

Engine failure during flight
(Flameout)



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

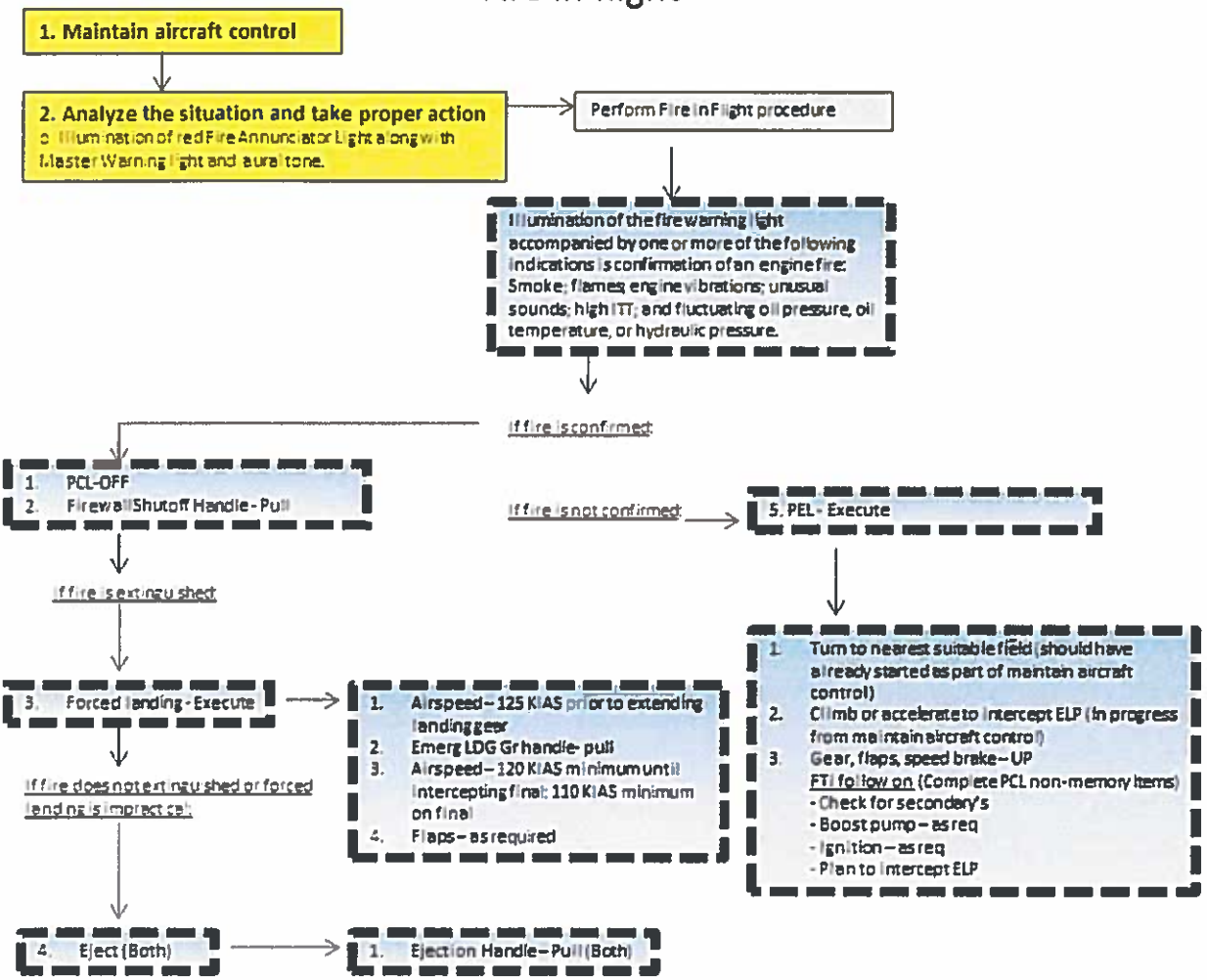
In the above scenario the net result will require a PEL , Forced Landing, or Ejection.



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will require a Forced Landing, or Ejection.

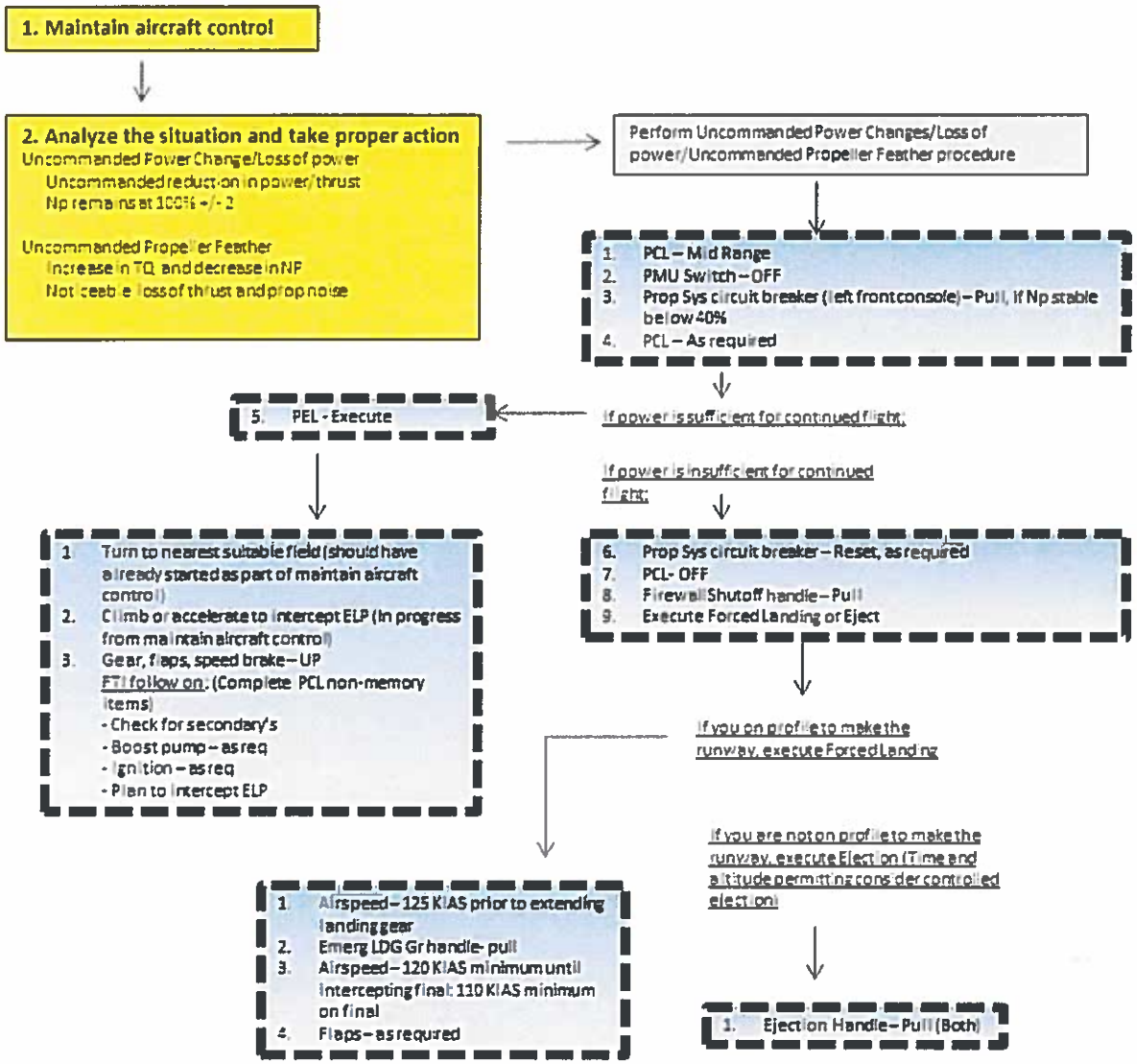
Fire in flight



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will require a PEL, Forced Landing, or Ejection.

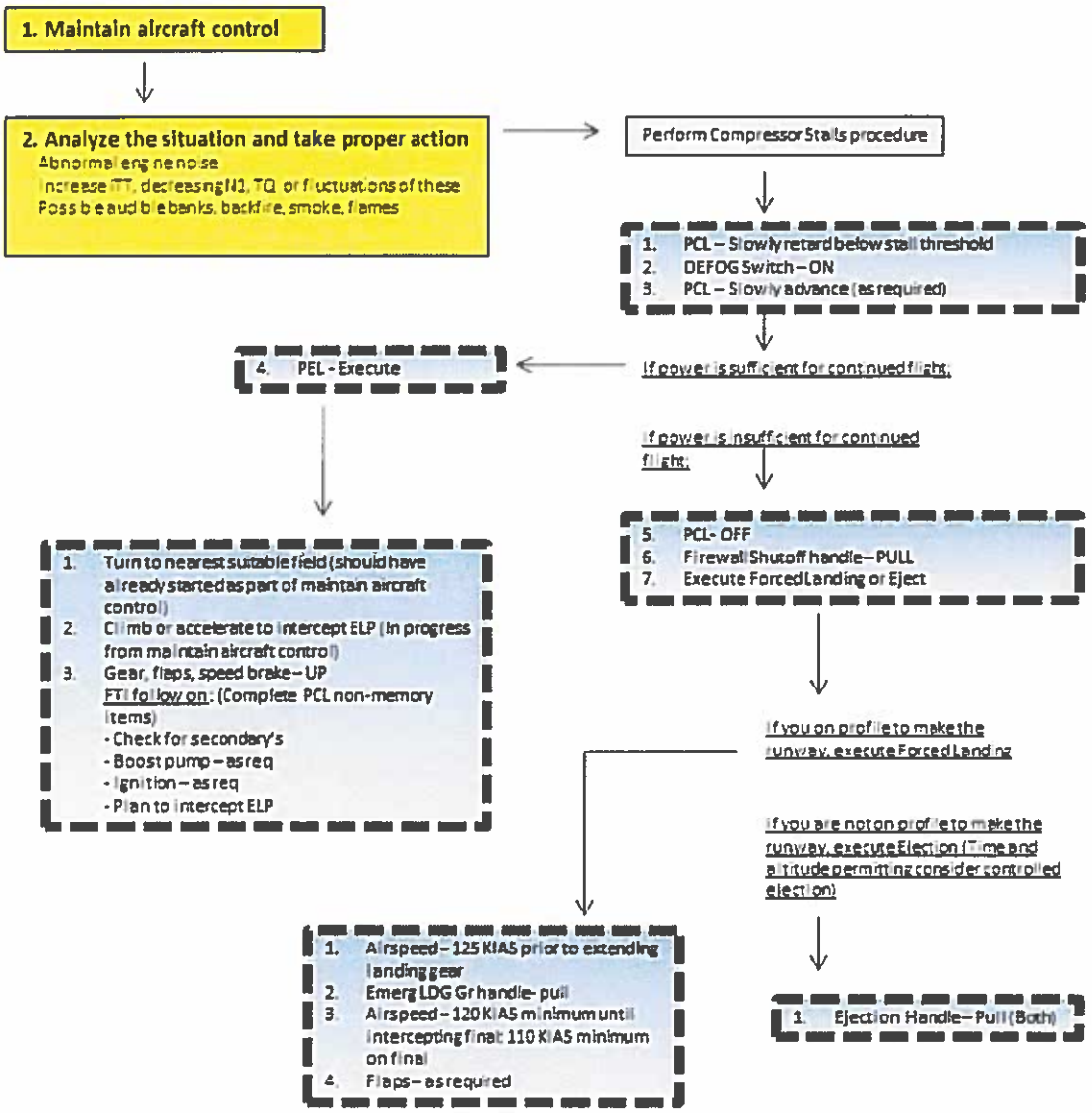
Uncommanded Power Changes/Loss of power/Uncommanded Propeller Feather



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will require a PEL, Forced Landing, or Ejection.

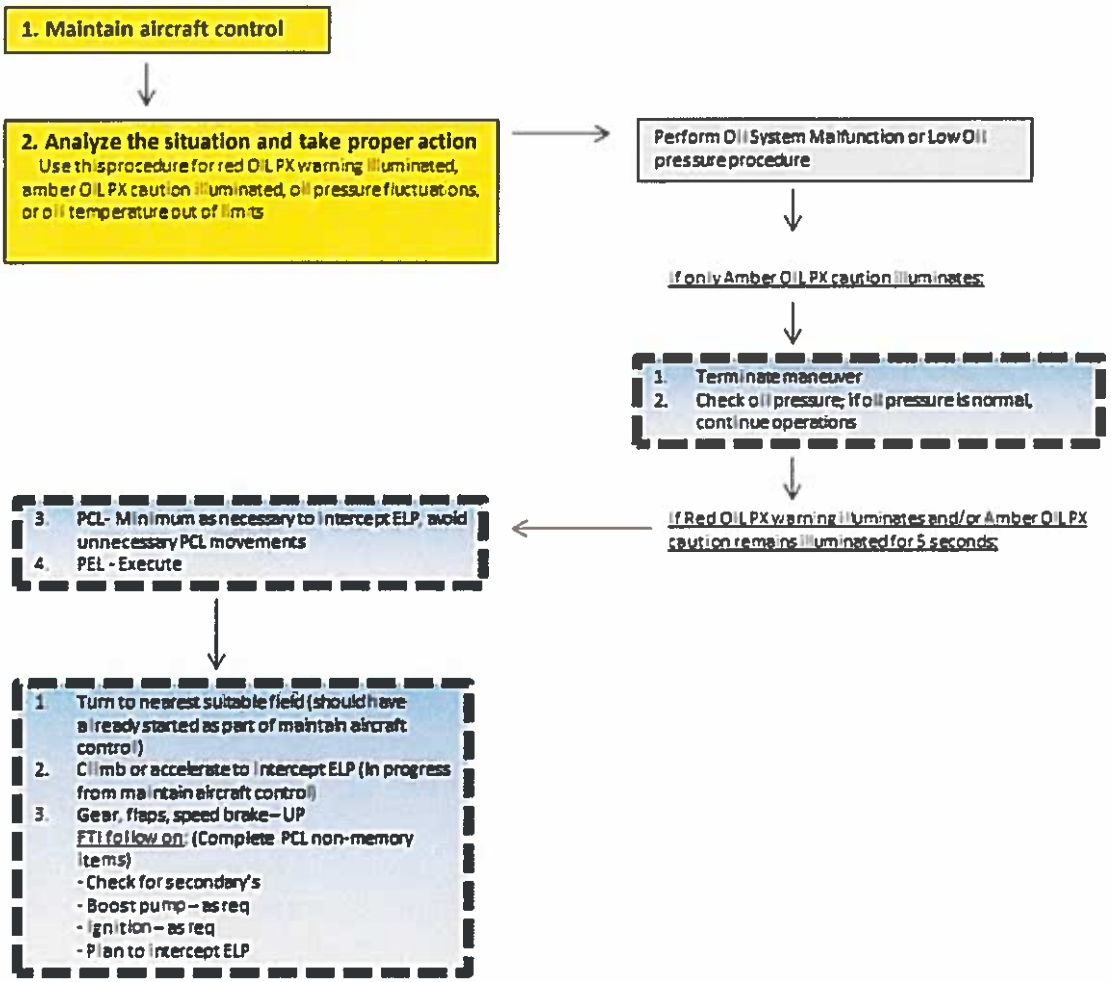
Compressor Stalls



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will require a PEL, Forced Landing, or Ejection.

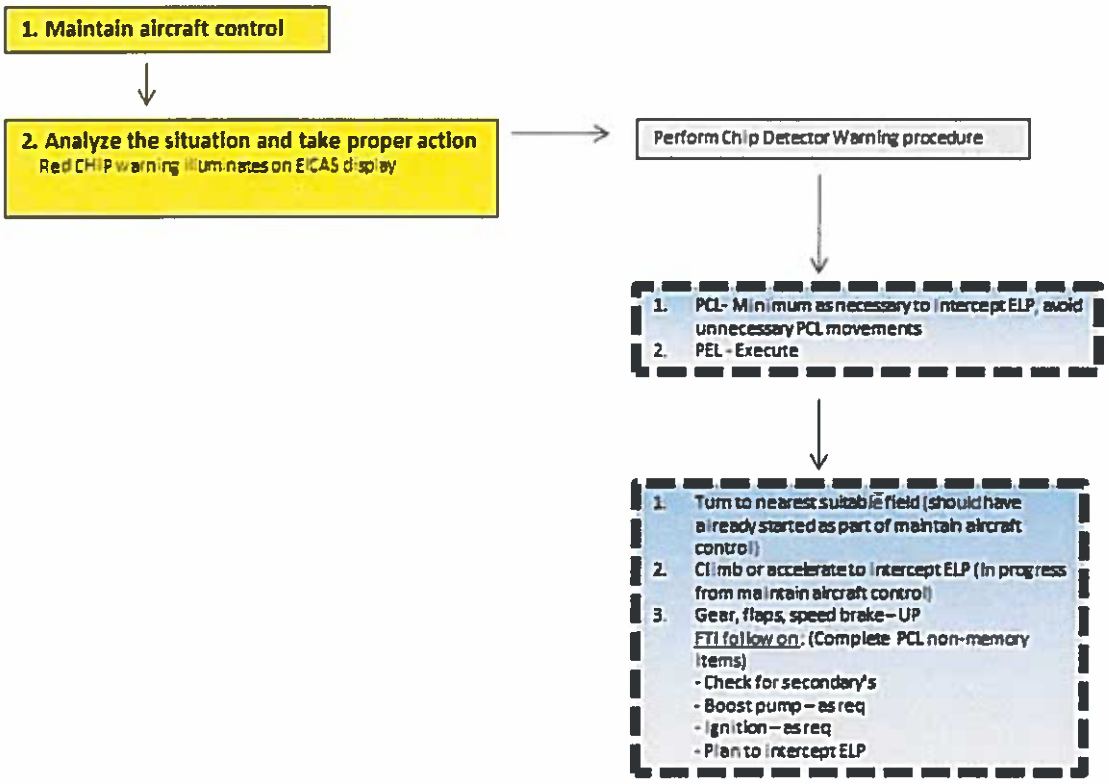
Oil System Malfunction or Low Oil Pressure



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will allow continuing operations or require a PEL.

Chip Detector Warning

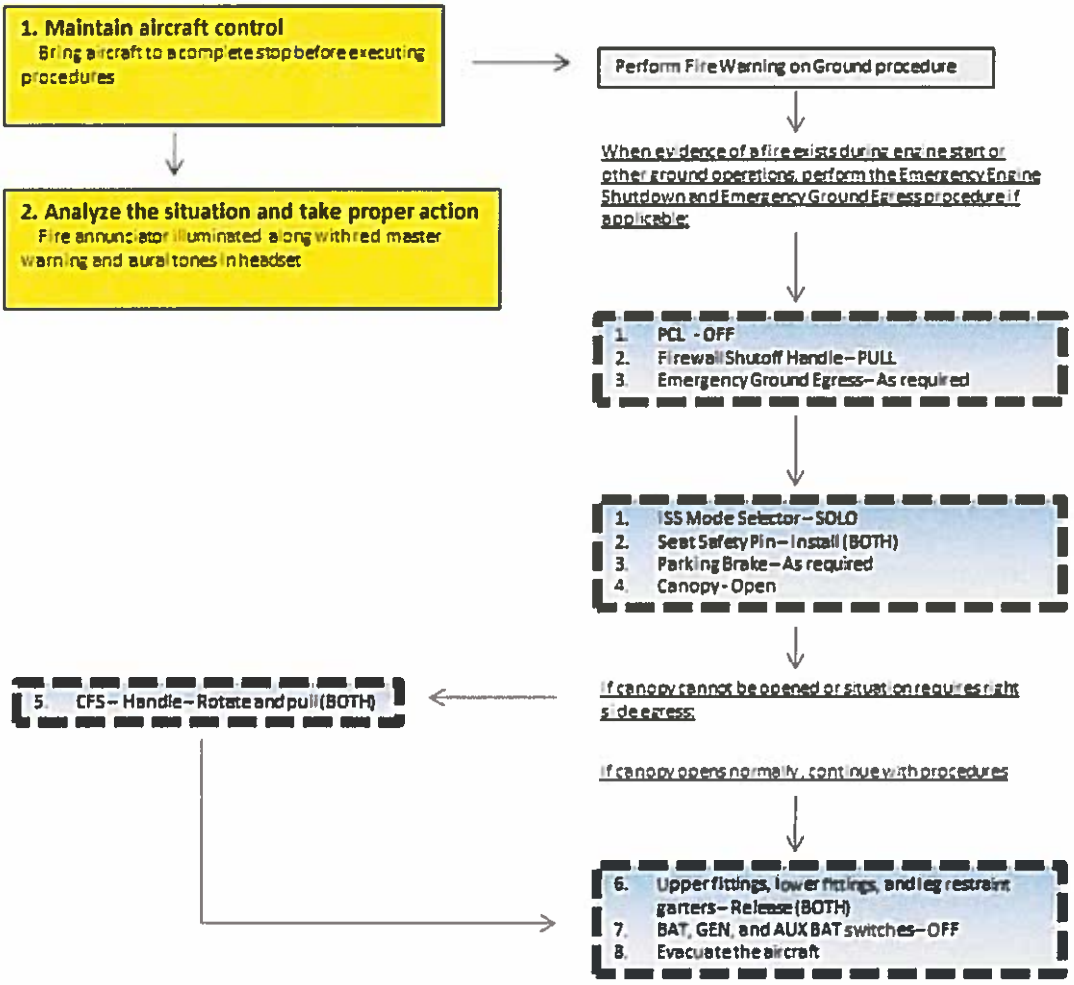


3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

In the above scenario the net result will require a PEL.

Fire Warning on Ground

(scenario: aircraft is taxing to ground run-up area when emergency occurs)



3. Land as soon as conditions permit: Defined by urgency of emergency or malfunction and sound judgment.

Not applicable for this scenario, however some things to consider:

- Fire light alone is conformation enough while on the ground
- Techniques to execute emerg ground egress for fire on ground
- Use crew coordination if required to activate/use CFS
- Contact ground and notify of emergency prior to securing power

10

Key points of interest

▪ Zoom Glide: Above 150 KIAS, 2G pull up to 20° climb angle, 20 knot lead with 0 to +0.5G pushover. Below 150 KIAS, perform constant deceleration to glide speed.

▪ Crosscheck N1 against other engine indications to assess condition of engine and determine if an airstart is warranted. At 125 KIAS an engine which has flamed out will rotate below 8% N1 and indicate 0% N1. The engine oil pressure indicator may display oil pressures up to 4 psi with N1 of 0%.

▪ Propeller will not feather unless PCL is fully OFF.

▪ Airstart procedure is not recommended below 2000 feet AGL, as primary attention should be to eject or safely recover the aircraft.

▪ Do not delay decision to eject below 2000 feet AGL.

▪ PCL must be OFF to feather the propeller, and ensure proper starter, ignition, boost pump, and PMU operation during airstart.

▪ If N1 does not rise within 5 seconds, discontinue the airstart.

▪ Movement of the PCL above IDLE before N1 stabilizes at approximately 67% will cause an increase in fuel flow which may cause engine failure due to severe ITT overtemperature.

▪ If there is no rise in ITT within 10 seconds of fuel flow indications, place the PCL to OFF and abort the start.

▪ Typically in excess of 1200 feet will be lost for each airstart attempt. Propeller will unfeather and accelerate to operating RPM approximately 20 seconds after N1 reaches 45%. Useful power will be available after 40 seconds from starter engagement.

▪ If rate of descent (indicated on the VSI while stabilized at 125 KIAS with gear, flaps, and speed brake retracted and 4 to 6% torque) is greater than 1500 ft/min, increase torque as necessary (up to 131%) to achieve approximately 1350 to 1500 ft/min rate of descent. If engine power is insufficient to produce a rate of descent less than 1500 ft/min, set PCL to OFF.

▪ With PROP SYS circuit breaker pulled and the PMU switch is OFF, the feather dump solenoid will not be powered. The propeller will feather at a slower rate as oil pressure decreases and the feathering spring takes effect. Glide performance will be considerably reduced and it may not be possible to intercept or fly the emergency landing pattern.

▪ If the engine should fail while flying the PEL, refer to Engine Failure During Flight Checklist and transition to the Forced Landing Procedure.

▪ Once on PEL profile, if engine is vibrating excessively, or if indications of failure are imminent, set PCL to OFF.

Appendix A

On-Wings and the Fam Zero

1. Standards

a. YOUR ON-WING'S PERFORMANCE IS OFTEN A DIRECT REFLECTION OF THE DILIGENCE, PROFESSIONALISM, AND INSTRUCTIONAL SKILL YOU BROUGHT TO BEAR AT THE ONSET OF THEIR TRAINING. YOU ARE INVESTED AND SHOULD TAKE PRIDE AND SATISFACTION IN THEIR CONTINUED SUCCESS.

b. Primacy: Everything you teach, either by example or instruction, to your students will be for the first time in a military aircraft. You are setting the foundation for their entire aviation career. The law of primacy states "The first example often creates a strong unshakeable impression." As the instructor, you must teach it right the first time.

c. Demonstration: For the student, it means learning must be right the first time. Un-teaching is more difficult than teaching. It is extremely important for the instructor to recognize if the demonstration was done incorrectly. You must then explain to the student what was incorrect and then re-demonstrate the maneuver per JPPT CTS. Allowing a student to walk away from an incorrectly performed maneuver will, best case, cause confusion and, worst case, cause an unsafe situation.

d. Checklists: Teach your on-wing proper checklist discipline, not IP short cuts. SNAs do not have the foundation to understand when and why some items can be done out of order. Furthermore, it will simply create frustration on their part when they fly off-wing.

2. Continuing Education

a. When your on-wings leave for their off-wing flights instruct them to report back to you things that were different (good or bad) when they return for C4301. This will help ensure your standardization and make you aware of techniques you may not have considered.

b. IPs should get a thorough debrief from their on-wing's C4490 Check Pilot. This can give the IP valuable insight into the effectiveness of his/her teaching techniques and the opportunity to correct any standardization issues for future on-wings. Each set of new on-wings should consistently receive better and better instruction than the IP's previous set.

3. Best Practices

a. Conduct your on-wing's Fam Zero to the maximum extent practical. In some scenarios someone else may perform your student's Fam Zero. Due to time constraints and different personalities every Fam Zero will not be the same. You may want to set time before your first flight with your on-wing to ensure they understand your expectations and identify any potential deficiencies in training thus far.

b. Common Expectations. Remind students they are first and foremost military officers. They should stand and introduce themselves. They should keep good eye contact throughout the brief. Exuding respect, confidence, and a positive attitude will go a long way in establishing a good first impression.

(1) Students should arrive at the brief with any questions they could not find an answer to.

(2) **Discussion items.** SNAs are responsible for briefing all discuss items, Special Syllabus Requirements, and IP demos during the brief. If an EP is listed as a discuss item, it does not need to be memorized, but they should know it well enough to speak knowledgeably about it without referring to the PCL. SNAs should strive to know and understand each discuss item to the level they can teach it to the instructor. Emphasize to your students there may be multiple sources of information for any given discussion item.

(3) **Emergency procedures.** All critical action steps to EPs are a SNA's responsibility all of the time. These items shall be completed without reference to the checklist. Time and conditions permitting, they should review/complete the procedures utilizing the pocket checklist. Notes, warnings, and cautions (N/W/C) attached to critical / asterisked items should be recalled by memory. While N/W/C are not necessarily required to be memorized verbatim, the SNA must understand and be able to implement the intent of each one. SNAs should also be knowledgeable of non-critical action EPs (and their associated N/W/C), because an emergency as a solo is not the time to begin familiarizing oneself with these items. This requires a thorough understanding of the steps and why they are being accomplished.

(4) **System briefs.** They should be prepared to discuss all numbers, limitations, normal and emergency procedures associated with the system, with a particular focus on understanding the cause of the malfunction and the purpose of the corrective action. Focus on the big picture of what will affect your decision making in the air.

(5) **Mission Planning.** Teach your on-wing that by using the active runway at NSE and the ADDS METAR and Winds / Temps web

pages, they can make an educated guess on what runway will be in use at the OLF. They should start thinking through the flight. Some things to think about might include: run up area, taxi routes, departure procedures, winds aloft effect on area orientation, ground checkpoints for OLF initial and downwind, effect of forecast crosswind on OLF pattern, route from the OLF to course rules, and entry point to NSE (Waldo or Easy). Answering these questions before the brief will help them start the event "ahead of the aircraft."

(6) **Communication.** Explain to your student if you prefer text or a phone call but remind them when in doubt, find the IP or call and leave a professional voicemail. At a minimum, you should demand immediate notification of the items listed below. Consider having the student initiate immediate communication by a daisy chain text message to include yourself, Class Advisor and Flight Leader. This will help the Class Advisor and Flight Leader by preventing surprises or possible delayed administrative actions when ATJs are reviewed.

a. IMSAFE
b. Marginal, UNSAT
c. Med down Status
d. Med up Status
e. Airsick (Passive or Active)

(7) **Change of Controls.** With the frequency of swapping the controls that will occur in the first four flights, IPs should discuss aircraft control while flying. IPs should explain to the SNA the need for IP defensive positioning during various stages of flights. Briefing AND debriefing this will go a long way to help your on-wing understand when and why you are "riding the controls." Rules for your on-wing to live by:

(a) **You must know the procedures during the brief with very little effort or delay.** If they can only remember 90% of the procedure on the ground, they will only remember 50% of it when they are also trying to maintain altitude, airspeed, and talk on the radios.

(b) **Academic classes are only an introduction to the required knowledge.** Only through repetition and dedication will they reach an appropriate level of understanding.

(c) **Beware of gouge.** "Live by the gouge, die by the gouge." Your official publications are the only approved references. Always verify the gouge using the latest version of your NATOPS, FTI, and FWOP.

(d) **The JPPT program uses the building block approach. There is no substitute for preparation.** They cannot afford to forget previously memorized knowledge, or just "cram"

the information you need tomorrow; they need to learn information as it is presented. They are responsible for knowing all previously introduced or discussed knowledge or procedures.

CHECK RIDE / SOLO CHECKLIST

Below are additional considerations not specifically covered under the Contact Stage Discuss items, or items that may need to be reviewed on C4304

☐ Safe for Solo class complete ☐ Limitations (for Solos) ☐ Solo on deck fuel (SOP) ☐ Use of squelch on/off ☐ Turn guard on/off[1] ☐ Retrieving takeoff and land times ☐ NATOPS / pubs currency ☐ Read and initial currency ☐ EPs and limitations ☐ SNA to anticipate discussing ANY system of choice by IP ☐ IMSAFE[2] ☐ CO Routes[3] ☐ Understanding the Minimum Elevation Figures on VFR sectional ☐ Non-standard comms (Continue, Check Freq, Go around, etc…) ☐ Common deferred malfunctions (OBOGS fail, TCAS fail, etc…)	☐ Inadvertent IMC (Beyond the declaration of the emergency) ☐ Emergency WX scenario forcing student abandon course rules and return to previous used OLF ☐ NORDO procedures (FWOP) ☐ COM card (Inflight Guide) ☐ NORDO scenario, returning to KNSE, SNA does not see ALDIS lamps ☐ Familiarity with divert airports and why 260 lbs fuel for PNS ☐ Understanding of minimum and emergency fuel ☐ Understanding of Aircraft Discrepancy Book ☐ Five Spins completed before C4501 and one completed within five days of C4501 ☐ TAD Fail vs TAD off ☐ Gust factor and its effect on rotate speeds and flap selection

---

[1] ELT transmissions sometimes pose a communication hindrance over UHF. If the ELT transmission continues, deselecting guard on the UFCP will silence the ELT. Remember to turn Guard back on.

[2] This will be the first time your student has the potential to fly twice in one day. They should be prepared to do a thorough self-evaluation and use the IMSAFE program if needed. Consider their first brief time and any delays.

[3] Using CO Routes is an excellent tool for reduced visibility or disorientation. It also has a high potential to cause a greater risk to safety of flight by going heads down for a prolonged period of time. Use your discretion based on the student's performance.

Appendix B

Fuel Planning

This appendix is offered as a discussion on fuel considerations during training evolutions and is not a substitution for governing regulations.

BINGO FUEL. Bingo fuel is a pre-briefed fuel state that allows the aircraft to return to base (RTB) of intended landing or an alternate, if required, using preplanned recovery parameters and arriving with normal recovery fuel. Normal recovery fuel is the fuel at the initial or at the final approach fix (FAF) for the base of intended landing or alternate, if required. This fuel quantity will normally be 200 lbs. Depending on the sortie profile, you can find yourself fuel limited when executing local flights. Changes in weather and aircraft malfunctions can necessitate IPs to update their fuel planning. Proper fuel planning is essential to mission success.

Minimum fuel	200 lbs	Touch and go	25 lbs
Emergency fuel	120 lbs	Initial	50 lbs
"Land with" fuel	200 lbs + Alternate	OLF from NMOA	25-50 lbs
Course rules (north)	100-125 lbs	IFR approach	75 lbs

Bingos calculated based on 125 lbs on north course rules, 75 lbs VFR divert to PNS, landing with 200 lbs:

Brewton - T-intersection - NSE	~50 miles	400 bingo
Evergreen - 5 lakes - NSE	~55 miles	400 bingo
Sherman - Sweet - NSE	~55 miles	400 bingo
Barin - Chicken Ranch - NSE	~70 miles	450 bingo

If weather is IFR at NSE, add 50 lbs to account for a 125 lb IFR divert to PNS.

Note: All flights operated under CNATRA are required to designate and have fuel to reach an alternate regardless of destination weather. When the aircraft fuel state reaches the bingo value set on the EICAS, a new value must be set. Therefore, you should know what value you want to set and why. A suggested sequence would be:

750 joker - high area to OLF; when that goes off, set…
400 bingo - depart OLF to course rules; when that goes off, set…
275 bingo - VFR divert to PNS to land w/ 200 lbs; then set…
200 bingo - declare minimum fuel if you haven't already

JOKER FUEL. A pre-briefed fuel state to commence transition to the next phase of flight. For example:

BINGO FOR COURSE RULES RETURN FROM KGZH	400 lbs
OLF Patterns	
10 touch and gos	250 lbs
Reset for HK/Initial	50 lbs
From NMOA 3B to OLF	25 lbs
JOKER FROM AREA TO GET PATTERN WORK	400+325 = 725 lbs

Appendix C

T-6B Maintenance Troubleshooting Tips

1. **Standard Trouble Shooting** - Switch, Circuit Breaker, Bus (powering the CB), Component failure.

2. **EHYD Light** – During the walk around ensure that the Emergency Hyd Press bleed handle in the hyd access bay is fully seated or EHYD light may not go out.

3. **IRS DEGRADE** – The IRS Gyros are not using GPS to update the navigation solution. NATOPS says in a NOTE that you "should" delay taxi until it resolves. You can still fly a Ferry Flight (Per MESM) but HUD CDM / FPM and ground track on TSD may be less accurate. The TSD may not match, though the NATOPS does not indicate this. More maneuvering equates to greater chance for IRS drift.

4. **IAC FAIL** – If the Probes Anti-Ice is left on during taxi or is turned on too soon before takeoff the pitot tubes will get hot and fail the IACs. You might also notice an "X" through TAS. Once the probes cool the system will return to normal.

5. **AIRFRAME or PROP VIBRATIONS** – This could be the prop or spinner, but it could also be an air conditioning fan belt deteriorating. To check, turn off the air conditioner and see if it is still vibrating. Other possibilities include outboard gear door failure where the door swings freely in the wind.

6. **BFI Misalignment** – Be cautious when conducting a re-alignment airborne (through the BFI display menu). It may not re-align even with straight and level un-accelerated flight for 90 seconds.

7. **OBOGS Fail** – Common on the ground and usually caused by condensation or "muck" in the drain lines which are located in the speed brake well. First check connections, ensure both masks are on, and recycle the front and aft cockpit OBOGS switches at the same time to reset the 3 minute timer. Selecting 100% and max will force more air into the system. Also, moving the PCL above idle, even just a couple of percent torque (and especially during the run-up), may be sufficient to get the line opened.

8. **Starter** – Will not engage or disengage, such as when turning the motor in Manual for high IOAT. Ensure Starter Switch is in the center / NORM position. You may try AUTO / RESET as for an abort start. Finally, you may have to turn the battery switch off. Maintenance may not be able to duplicate it. This problem may indicate a pending starter failure.

9. **Altitude Warnings** - Random during flight–Select ZERO altitude for the RADALT on your UFCP and turn the TCAS on and off.

10. **Canopy Hard to Open** – It could be that the cabin isn't fully depressurized. Ram / Dump the cabin and the handle and canopy will be easier to operate.

11. **Electrical / Avionics** – Removing and reapplying electrical power to the affected system usually works. Secure the Avionics Master Switch, then the Generator, then the Battery. Turn them back on in reverse order. You will have to reset your PMU if you secure all power. If you have to reset a system in flight, things get a little tricky and you should determine the necessity of the malfunctioning equipment. **Absolutely avoid** securing the Aux Batt in flight if you have to secure the battery. Otherwise you will be without an attitude reference for a while.

12. **Ignition** - will not turn off after start (indicated by green IGN SEL on EICAS) - Bang (hard!) on the rear cockpit glare shield, top right side, to get the Ignition relay to disengage.

13. **Bleed Air Malfunction** – Indicated by a failed anti-G test. Turn the DEFOG switch ON for 30 seconds, then OFF for 30 seconds, and retry the anti-G test. Alternatively, place Bleed Air Inflow switch to High.

Appendix D

Airsickness

1. Airsickness (AS) in the T-6B is prevalent with 60 percent of student naval aviators (SNA) experiencing some form of AS. CNATRAINST 6410.2 Series is the guiding document for AS at TRAWING FIVE. All instructors should be familiar with this instruction and know their responsibilities when dealing with airsick students. The following two paragraphs are a few highlights of CNATRINST 6410.2 Series.

2. Per the AS instruction, "there are primarily two types of AS; "passive AS" is associated with nausea and other discomforting symptoms but without vomiting; and, "active AS" is characterized by vomiting. Passive AS, for the purpose of this instruction, **shall** be managed in the same manner as active AS, **if** the aviator's discomfort or nausea results in deviation from mission profile or affects the aviator's ability to complete tasks. Mild nausea that does not affect the aviator's ability to safely and satisfactorily complete the sortie shall be considered not significant." **"Students shall be referred to the flight surgeon if they are airsick on both C4101 and C4102 or after any episode of AS post C4102."** Additionally, and per the instruction, Instructor pilots (IP) **shall** document all episodes of AS on the SNA's ATF by marking the box for AS on the details tab and making a comment in the comments section. Additionally, IPs **shall** complete the AS notification form and refer the SNA to the flight surgeon.

The prevailing theory on AS is it is caused by sensory mismatch between the visual system and the vestibular system. As such, we need to try and reduce this mismatch by having the SNA look outside as much as possible. Further, the FAA recommends a pilot look outside 70 percent of the time to avoid a midair collision. This outside visual scan has three benefits in VMC; it will reduce the chance of a midair, reduce sensory mismatch, and improve basic air work resulting in smoother flights; the last two benefits will reduce AS. Unfortunately, the information dense instrument package on the T-6B leads many students and instructor pilots alike to focus inside the aircraft often resulting in AS. AS will usually abate with continued, consistent flying. **Per CNATRAINST 6410.2 Series, AS SNAs shall be priority scheduled to help them overcome AS.**

There are many options to alleviate AS both prior to flight and during flight.

Preflight

Prior to flight aircrew should watch their diet, rest, consume ginger, stay hydrated, avoid alcohol, and be well prepared which reduces anxiety leading to stomach awareness.

(1) Diet and Hydration. Maintaining a balanced diet is essential for overall wellness. Eating bland food with adequate complex carbohydrates and protein an hour before flying is advisable. Avoid the following 24 hours prior to flying: dairy products, acidic foods, spicy, greasy, and fatty foods. Maintain proper hydration with non-acidic juice, water or a sports drink. Take and consume ice cold water on training flights. Also, pouring ice cold water down one's back greatly reduces feelings of nausea. The primary purpose of this particular diet, prior to flight, is to reduce/minimize the amount of stomach acid.

(2) Rest. Eight hours of uninterrupted sleep is recommended the night prior to flying for optimal performance.

(3) Ginger. Ginger root pills create a gastrointestinal relaxation effect that helps prevent AS and has no adverse medical side effects. Also, they have been approved by the flight surgeons. Recommended dosage is one 250 mg pill with dinner, one pill with breakfast, and one pill with food after the flight brief and prior to walking to the aircraft. **Ginger taken alone can be harsh to the stomach, so pills should always be taken with food.**

(4) Anxiety. Proper preflight preparation with studying and chair flying will help decrease anxiety. Regular physical training, like weight lifting, running, swimming, etc. will reduce stress hormones. Remember to re-hydrate following strenuous exercise. The NASWF Fleet and Family Support Center provides stress management classes that have proven successful in treating anxiety associated with AS. Also, meditation is beneficial for reducing stress and anxiety.

In-flight

In flight, the scale used to describe AS ranges from 1-10, with 1 being no symptoms and 10 being active AS (vomiting). This scale varies widely among students. Symptoms may include: stomach awareness, lethargy, apathy, sweating, salivation, drowsiness, headache and vomiting.

Prevention

Aircrew should be proactive during flight to reduce AS prior to reaching elevated levels (4-6). Once symptoms occur aircrew need to take action to prevent the AS from becoming more severe and hampering safety of flight. Multiple steps can be taken to minimize or reduce symptoms while flying.

(1) Look Outside. Aircrew should look outside as much as possible leading with their eyes followed by slow head movements. This allows the visual field to stabilize on the retina prior to vestibular stimulation and reduces the sensory mismatch.

(2) Avoid Zero/Negative Gs. These maneuvers should be avoided as they will often cause nausea even in experienced aviators. If flown correctly none of the maneuvers in the T-6B JPPT require zero/negative Gs with the exception of a zoom glide maneuver or inverted flight. Most zero/negative Gs in the T-6B are intentional or caused by a student being behind the aircraft resulting in rapid pitch corrections. Student preparation (chair flying) along with IP coaching can help minimize zero/negative G situations, thereby reducing AS.

(3) G-Awareness/G-EX. Sensitivity of the instruments during high performance maneuvers can cause SNAs to chase the proper attitude. The resulting erratic up and down nose movements above and below the horizon and loading and unloading of Gs causes poor performance and AS, as well. Find a point on the aircraft (e.g. the point where the upper exhaust stack meets the airframe) to drag across the horizon. This will enhance an outside scan and minimize erratic pitch changes and G loading.

(4) Power-on Stall. With nothing above the glare shield to stimulate vision, a natural tendency is to look solely at cockpit instruments. To avoid AS, SNAs should momentarily look inside with eyes only (minimize rapid head movements) to verify attitude while slowing through 100 knots. Then SNAs should recover looking outside while glancing at AOA and airspeed again with eyes only.

(5) ELP Stalls. Initial recovery will have the nose of the aircraft searching for a stable attitude. Until the aircraft stabilizes, aviators should use the prop arc on the horizon as a visual reference. Only after the prop arc is stable on the horizon should the 8-10 degrees nose down be verified on the attitude indicator and airspeed checked.

(6) Unusual Attitudes

Nose High: Negative G-loading unsettles the stomach. If flown properly per the FTI, nose high recoveries should maintain positive Gs on the aircraft, which is particularly important to avoiding AS.

Nose Low: For nose low recoveries, the anti-G straining maneuver should be utilized for recoveries exceeding 3 Gs.

(7) Spin. The abnormal and abrupt motion of a spin can render the stomach queasy. Unlike all the other maneuvers, maintain an inside scan as much as possible while conducting spin training. Looking outside too quickly during spin recovery will induce AS. If altitude and airspeed permit, wait for rotation to stop, look outside and level the wings with the horizon avoiding excessive G-loading during recovery pull-out. The anti-G straining maneuver should be utilized for recoveries exceeding 3 Gs.

(8) Aileron rolls. This maneuver is one of the most nausea inducing maneuvers in the T-6B. The rapid roll rate followed by a sudden stop during these maneuvers often causes nausea. This has to do with the vestibular system sensing a rapid acceleration and then a rapid deceleration. This can be mitigated by performing a normal aileron roll and then reducing the roll rate during the last quarter of the roll. This reduces the radial deceleration sensed by the vestibular system. Additionally, SNAs will do better rolling out wings level with the horizon using a slightly slower roll rate at the end of the maneuver. This maneuver should be the last one performed during the aerobatics profile if students experience AS associated with it.

(9) Landing Pattern. Coupled with additional turbulence, the dynamic nature of the landing pattern can cause a lot of head and aircraft movements that incite AS. AS recovery is difficult in the landing pattern because flying wings level is not possible. For instance, when the aircraft is #1 upwind, it has to turn and at the abeam position it must also turn. If time and fuel permit, depart the pattern to recover and reenter when AS subsides.

Recovery

When AS is recognized, SNAs should be proactive and not reactive when trying to correct the problem; don't just endure it.

(1) Communication. If a SNA starts to experience AS, they should inform the IP the degree of AS using the 1-10 scale (1 is feeling normal, 10 is vomiting) after each maneuver.

(2) Cockpit management. Cockpit management and maintaining controls of the aircraft, as much as possible, are imperative to avoiding AS. Storing gear in the right pocket causes students to fly with the left hand, with which they are not proficient. Placing the airsickness bag in the storage compartment will necessitate excessive head movement and an inside scan when an outside scan is needed the most. SNAs should place the unzipped airsickness bag where they can get to it without unnecessary head movements. For improved SA, when the IP demonstrates a maneuver, SNA should ride the controls so as to not be surprised by unanticipated aircraft movements.

(3) Reduce airspeed. Slow to 150-160 knots and have the SNA fly the aircraft wings level. Slowing down saves fuel, reduces turbulence, and permits more straight and level flight needed to recover. Resuming maneuvers too quickly will cause a relapse.

(4) Cool down. While continuing to fly with their right hand, SNAs should undo the left sleeve and put their hand above the air conditioning vent on the glare shield, so cool air flows up the sleeve and cools the core.

(5) Diaphragmatic Breathing. SNAs should perform deep diaphragmatic breathing when AS symptoms begin. This is done by closing your mouth and inhaling slowly through the nose so that the abdomen expands fully, wait one (1) second. Slowly exhale through the mouth fully, wait one (1) second. Continue at a slow, comfortable pace for a minimum of five (5) cycles. This technique helps prevent air swallowing and hyperventilation. Resume normal breathing once AS symptoms have dissipated.

(6) Water bottle. Ice cold water should be taken on every flight by SNAs suffering AS. Ensure the bottle contains ice water, so that when it is poured down their back, it will stimulate their autonomic nervous system. In most instances, this procedure will reduce symptoms immediately. The water bottle should be small enough to be stored in the left G-suit pocket and have a top that permits one-hand operation. This allows the right hand to remain on the flight controls. Most right-handed people will instinctively use their right hand to hydrate, forcing them to fly roughly with their left hand. SNAs should sip water to relieve mouth dryness that often develops during AS. Water fountain water will not be cold enough to provide relief. SNAs should be proficient disconnecting and reconnecting the left bayonet fitting of the oxygen mask to enable them to drink water with minimal head movements.

CAUTION: An excessive amount of improperly poured water could cause inadvertent LPU activation.

If you have any additional questions do not hesitate to call the AMSO at 623-7926 or 623-7925.